STATE LIBRARY OF PENNSYLVANIA
3 0144 00134794 7

Py F532.17/4

CLASS P~~38.31~~ BOOK 1~~.6~~

VOLUME 2

PENNSYLVANIA
STATE LIBRARY

JOSEPH RUZICKA
BOOKBINDERS

Digitized by the Internet Archive
in 2016

https://archive.org/details/pennsylvaniaangl00unse_0

Vol. 2

PENNSYLVANIA ANGLER

PROPERTY OF
PENNA. STATE LIBRARY

NEWS BULLETIN FOR FISHERMEN

JANUARY, 1933

P38.31 R
1.6

is only possible where the inhabitants therein are a contented people and one of the greatest problems confronting this country today, is to provide for healthful recreation during their idle moments.

Thanks to the forethought and diligent efforts of the various commissions having jurisdiction over the wild life of our State, most of Pennsylvania's natural beauty and wild life has been preserved or is being restored for ourselves and our posterity. The instinct of our people for the great out-of-doors, plus the automobile and modern highways, are bringing each year, hundreds of thousands into forests and on our streams where they while away many contented hours.

Fishing is one of the most innocent and wholesome recreative sports our great out-of-doors affords. This fine sport is being maintained through the active work of the Board of Fish Commissioners.

Until recently, the Board was greatly handicapped in its work. Protective legislation could not be enacted. The protective laws that were passed could not be enforced. The people could not be brought to see why our waters would not always teem with fish, with a result that over this period of years, our fish life was rapidly depleted by the indiscriminate destruction of fish by the fishermen as well as by the checks put upon their growth and natural reproduction by civilization. The men engaged in this type of conservation received little cooperation in a protective sense until the waters were practically depleted of fish life.

The Fish Commission foresaw that eventually artificial propagation of fish would be necessary and Pennsylvania was one of the pioneers in fish culture. In its early days it lacked trained men and money for carrying on this work. Only by the few men who have devoted their lives to fish culture, have our modern fish cultural methods been made possible. Again, this small group of men who devoted themselves to trying to preserve and maintain the fish, was greatly handicapped for lack of funds with which to carry on their work. Not much could be accomplished in the development of hatcheries or rearing plants, until the advent of the Resident Fishing License. In 1922, the Resident Fishing License was enacted after a fight of ten years in the legislature. The enactment of this license has probably done more to bring about good fishing in Pennsylvania than anything else. It has made possible the development of Pennsylvania's present fish cultural methods, comprising a group built from almost nothing in 1922 to the present modern plants which, when taken as a group, are second to none in existence today, and valued at approximately two million dollars. It has made the Board a self supporting institution. The revenue for carrying on its activities is derived from the Resident and Non-Resident Fishing Licenses. If one is not a fisherman or sufficiently interested in this work to purchase a fishing license, then he is not contributing to the support of the Board of Fish Commissioners.

The license has brought about closer cooperation between the Board and fishermen. The fishermen are familiarizing themselves with the Board's program and as a group, are assisting greatly in enabling the Board to follow it out.

No agency could accurately figure in dollars and cents, the recreational sport of angling, and until recently, the Board's efforts to maintain and improve fishing in Pennsylvania, were looked as a sporting proposition. But not so today. Probably few people realize the vast amount of money invested throughout the country in the business of catering to the vacationist's or tourist's trade. Many states are conducting extensive publicity campaigns, advertising their mountain scenery, beautiful lakes, streams and modern highways, always emphasizing the regions known for their good fishing. This is done for the sole purpose of deriving benefit of the money spent.

We have many communities in Pennsylvania, nestled along our beautiful streams or natural lakes, whose chief asset is this type of trade. Statistics show that good fishing which the Board is providing in these localities has done more to induce people to spend their vacation there than any other factor, with the possible exception of our highways.

Most recreational sport is more or less seasonal, but not so with fishing. Our laws provide that one or more species of fish can be angled for in every month of the year. Pennsylvania's army of approximately one-half million fishermen are composed of all types. The early spring fishing opens with the trout fishermen whipping our trout streams; later the bass fishermen make their appearance on our rivers and larger streams. Those who do not care for bass fishing, yet desire to pit their skill against the gamey varieties, are found on our many lakes and ponds angling for pickerel. In almost every month of the year, a great mass of fishermen including many women and children who do not care for the more gamey varieties, are found angling for sunfish, yellow perch, catfish, and suckers.

The saying is that if you are affected with the fishing germ you are going to fish. If Pennsylvania could not provide worth while fishing, the fishermen would be found elsewhere and Pennsylvania would lose this vast revenue.

Since enactment of the fishing license, fishing in the waters of Pennsylvania has been improving from year to year. Naturally, the better the fishing, the more the waters are fished and the more Resident and Non-Resident Licenses are sold, until today, Pennsylvania has more hook and line fishermen than any other state in the Union.

****

FOOD SUPPLY INCREASED BY STREAM IMPROVEMENT

Upon an abundant supply of natural food in Pennsylvania's trout streams hinges to a major degree trout fishing of the future. This food supply is a determining factor on the size and number of trout in any stream. Frequently fishermen think of trout forage in the form of minnows, small suckers, crawfish, and larger types of aquatic life. Essential though this source of food supply may be, an equally important factor is the presence in our trout streams of minute aquatic organisms and availability of insect life. While larger trout prey upon minnows and other types of forage fish, growing fry and fingerlings rely upon smaller organisms for their existence.

Stream improvement is generally recognized as an outstanding method for increasing the supply of natural food in trout streams. Fertile beds of silt are formed and serve as breeding grounds for smaller organisms, as do sunken logs, brush and other material. Through the building of dams, retards, and current deflectors on our streams, production of trout forage is greatly enhanced. In more quiet pools and eddies, on sand bars formed by the current, and on water-soaked brush and logs, this vital source of trout forage is harbored, where it is available as food for the trout. These quiet waters may also serve as resting places for trout after they have been feeding in the current.

While current deflectors in some of our Pennsylvania streams are quite practical, the building of dams and retards, whether boulder or log, is in many instances highly desirable. In former issues of PENNSYLVANIA ANGLER the manner in which boulder and log dams may be erected, and current deflectors constructed, was described. Another type of current deflector is known as the I-deflector, which may

be used to advantage in splitting the current. Michigan has made notable progress in recent years in stream improvement, and deflectors of various types have been tried.

When installed in mid-stream, the I-deflector serves to deepen two pools. This type of deflector, erected with boulders, or logs, placed crosswise at midstream, throws the force of the current toward both banks. Immediately below the log, sand bars may form in the comparatively quiet water. The top of the I-deflector should be flush with the water level of the stream. If logs are used they should be firmly anchored.

Midsummer is regarded as the most satisfactory and effective time for the work of stream improvement. Generally in July or August, streams are low, revealing areas suitable for improvement. From the angle of comfort, a day's work in the cold water of a trout stream is not so chilling at that time.

An excellent method by which cover may be increased, the placing of trees, with all their branches in streams, has been suggested by E. R. Hewitt, noted authority on stream improvement. When such cover is introduced, it is advisable to stake the tree firmly. If the branches are resting in a position counter to the current, drift lodging against them will increase the effectiveness of the shelter for trout.

With replenishment of the underground water supply, the importance of small spring runs, or feeders to the main trout streams, has been increased. Not only do these feeders furnish a supply of cold water, thus aiding in keeping the temperature of the main stream at low level during hot weather, but they serve as ideal spawning grounds for trout.

Improvement of the feeder streams is a vital feature in stream betterment. During the prolonged drought, many of these feeder streams became clogged with brush and muck. This condition not only served to eliminate them as spawning grounds for trout, but resulted in warming of the temperature through slowing of the current and in places forcing the water into wider shallow areas exposed to the sun. Planting of shade brush on the banks of spring runs, and cleaning them out, where necessary, will benefit many of our trout streams.

Major trout streams, having few or no feeders, may be greatly improved by introduction of brush shelters. These shelters serve as ideal protection for young trout. In streams of this type, protection is of primary importance, for the fingerlings require protection not only from natural enemies, but from adult trout.

Brush shelters may be composed of entire bushes, or loosely woven bundles of brush, wired firmly to stakes to hold them in place. Green brush, owing to the fact that it lasts longer, is most suitable for this type of shelter. Where a side channel in a stream may be found, brushing is particularly effective. Brushing at the juncture of tributaries is desirable, for the brush serves as shelter for fingerlings dropping into the larger stream from spawning areas.

The effectiveness of dams and current deflectors on trout streams may be increased by introduction of brush shelters. Overhanging brush and foliage is important to trout waters, providing not only shade, but a harbor for insect life, a valuable source of food supply for trout.

****

A FRENCH CREEK FISHING RECORD

August 23, 1932, is red letter day of them all in the fishing calendar of A. G. Sallee, ardent angler of Edinboro, Erie county, according to Warden W. E. Briggs, Erie. Fishing in French Creek, near Juva bridge, on that date he landed four battling game fish, representing as many outstanding species of the inland waters of Pennsylvania. One French Creek pool yielded a muskellunge, a small-mouth black bass, a wall-eyed pike, and don't miss this - a brook trout.

The muskellunge measured 26 inches, the black bass, $21\frac{1}{2}$ inches, the wall-eyed pike, 27 inches, the brook trout, 14 inches. Mr. Sallee carefully returned the brook trout to the stream.

When he made this unusual catch, the Edinboro angler was using a $4\frac{1}{2}$ ounce split bamboo rod, made by himself, a #12 line, a #3 spinner, and weedless hook baited with home-cut pork rind.

The size of the fish landed, plus variety, make the catch exceptional. When a brook trout shares feeding grounds with "tiger" muskies - what a brookie!

****

TROUT, BROOK AND BROWN

A rise to fly, whether the silvery, red and mottled green flash of a brook trout or the golden surge of a brown trout, is thrill supreme for the angler. Both species are splendid game fish, worthy of the high esteem in which they are held by fishermen. On many of Pennsylvania's trout waters, mixed creels of brook and brown trout are taken.

In answer to numerous requests for descriptions of brook and brown trout, PENNSYLVANIA ANGLER offers the following article.

BROOK TROUT

A swift mountain stream, cascading into dark pools, swirling beneath the roots of giant spruce or hemlock, cold as the snows of winter - a meadow stream, heading in deep-seated springs, cutting its channels beneath overhanging banks - these waters of Pennsylvania are natural haunts of the charr or brook trout. Not only in coloration, vivid though it is, does the brook trout derive its title "most beautiful of game fishes." There is a grace, a symmetry, in this denizen of the brooks that stamps it swift and game. Nature has decreed that a great part of its life shall be spent head to the current, and that its markings shall blend with stream environment.

In the first stage of a brook trout's life the elements are an important factor. October and November find the adult fish migrating to the headwaters, their dorsal fins on many shallow riffles protruding above the surface. After spawning has taken place, that is, after the eggs deposited by the female on some tiny gravel bar have been fertilized by the male trout, the fish return to the main stream. Under natural conditions in our streams, the time required for hatching may vary from 90 to 210 days. Under ideal conditions at the Fish Commission's hatcheries, the period of incubation in the hatching troughs is from forty to ninety days, depending upon the temperature of the water. Dependent upon size and age, a female brook trout will produce from 250 to 2000 eggs.

The headwaters, fed by springs, are nature's incubators, and are necessarily governed by drought or flood. Man has placed limitations on these natural spawning grounds through cutting of the timber.

After the young fish hatch, they may remain at the spawning grounds during the first months of their growth, moving downstream after they pass their fingerling stage.

"The propagation of the brook trout," writes C. R. Buller, Deputy Commissioner in Charge of Propagation, "is conducted under widely differing conditions throughout the natural and acclimated range of the fish. While the general principles on which the work is based are essentially the same everywhere, the details connected therewith must necessarily be modified to meet the varying conditions of climate, water supply, location, and the purposes in view. The aim of this article is to outline only these general principles, as it is manifestly impossible to enter minutely into all the details that would apply in any given section of the country. The material for the description of methods outlined has been drawn from wide personal experience and observation.

"The brook trout or speckled trout (Salvelinus fontinalis) is one of the most beautiful, active, and widely distributed of the American trouts. It belongs to that group of trouts known as charrs, characterized by the presence of round crimson spots on the sides of the body. Other members of this class are the saibling or charr (Salvelinus alpinus) of Europe and (Salvelinus stagnalis) of Greenland; the red charr (Salvelinus Marstoni) of eastern Canada; the Sunapee trout (Salvelinus aureolus) found in parts of New Hampshire, Maine, and Vermont; the blueback trout (Salvelinus oquassa) of the Rangeley Lakes in Maine, and Dolly Varden, red-spotted, or bull trout (Salvelinus bairdii) of the Pacific States and Alaska. The lake trout (Cristinvomer namaycush) also belong to this group.

"The general form of the brook trout's body varies considerably, sometimes being elongated and sometimes rather short, but the usual depth is about one-fourth or one-fifth of the length. The head is large and blunt, and is contained four and one-half times in the body length. The large terminal mouth is provided with teeth on the jaws, tongue, and palate bones, and also with a small patch on the vomer, or front part of the roof of the mouth. The eye is placed high in the head; its diameter is about one-sixth of the length of the head. The gillrakers on the first arch number about 17, of which 11 are on the lower arm. The scales are very small and numerous; about 230 are in the lengthwise series and 35 above and 35 below the lateral line. The dorsal and anal rays are 10 and 9, respectively. The tail is square or slightly lunate in the adult; forked in the young.

"There is considerable variation in the color of this trout, dependent on local conditions, sex, and age. The head, back, and sides of the body, dorsal, and caudal fins are of a grayish or greenish color; the back, head, dorsal, and base of caudal are mottled with dark green or black. Along the middle of the side are numerous round, light-red spots surrounded by whitish or light-brownish circular areas. The lower fins are dusky, with a pale or cream-colored anterior border bounded by a black streak; remainder of fin often red in breeding males. The brook trout may be distinguished from the other charrs by the dark-brown or black marblings on the back and the general absence of spots on the back.

"The parr marks, which are always present in young trouts and salmons, are often found in large brook trout. These marks, which in the brook trout are about eight in number, are large, dark, vertical blotches or bars extending along the sides.

"The brook trout is closely related to the other charrs mentioned, but it has quite distinct color markings and is usually less slender in form. Individual brook trout, however, vary greatly in form and color; not only those of different waters, but often those of the same body of water or different parts of the same lake or stream. Modifications of both form and color also appear during the breeding season.

"The brook trout exhibits such a variation in color under the varying conditions of sex, age, size, and locality, that it has been given many local names by fishermen under the impression that it was a distinct species. This variation is a protection provided by nature which permits the fish to change its color and markings rapidly when passing from one environment to another. The appearance of brook trout under various conditions of environment may be described, in general, as follows:

"Slender, light-colored, and silvery in lakes, ponds and swift streams that are clear and sandy, or in parts of other bodies of water where such conditions obtain. Stout and dark-colored in lakes or ponds or localities of lakes or ponds having muddy bottomsand considerable vegetable growth and particularly water discolored by vegetable stain. The same may be said of streams, and it may be added that the swifter the flow of water where the trout occurs the more slender it is likely to be.

"As in external markings, there is likewise a great variation in the color of the flesh of brook trout. Although in most instances the flesh is white, trout with yellow or rich, red flesh are not rare. Several reasons have been assigned as the cause for this characteristic. W. C. Kendall, on page 543 of his paper on the Rangeley Lakes, Me., gives the following as the probable cause:

"'After taking everything into consideration it would seem that the character or quantity of food influences the color of the flesh only in its fattening effects, and it is only the intrinsic fat or oil in the fish which produces the red flesh and delicious flavor of the red-meated trout. The oil or fat is naturally red as that of some other animals is naturally white or some other color, and it is the amount permeating the fish that gives the color its intensity. A well-fed, comparatively inactive adult trout will present a more intensive shade of the flesh than a fish of the same age living in running water, where its livelihood depends upon its activity, although it may be a well-conditioned, shapely fish. In the latter instance the food has been assimilated and utilized in the development of energy.'"

BROWN TROUT

The brown trout, introduced from Europe in 1883, has endeared itself to Pennsylvania fishermen by its sturdy fighting qualities and adaptability to many of our streams. It rises readily to fly and is a wary feeder.

In body, the brown trout is comparatively short and stout. The greatest depth in its body is contained about four times in its length, discounting the caudal, or tail fin. The range between the anal fin (fin behind the vent) and caudal fin equals two-fifths of the length of the head. Without taking into consideration the caudal fin, the head of an adult brown trout is about one-quarter of its total length. In diameter, the eye is about one-fifth of the length of the head, and slightly shorter than the length of the snout.

The dorsal or back fin is located a trifle closer to the tip of the snout than it is to the root of the tail. The distance from the eye to the end of the opercle or gill cover is equaled by the longest ray of the dorsal fin. Located under the posterior part of the dorsal fin is the ventral fin, which is equal in length to about one-half the length of the head.

The adipose fin, a fleshy fin-like projection behind the dorsal fin is located over the end of the anal base; it is long and expanded at the end.

The tail of a young brown trout is slightly forked or notched at the tip; in trout ten inches or more in length, it is nearly square. In length, the pectoral or breast is nearly one-sixth of the total length without the caudal fin.

The jaws of the adult male brown trout are pronounced, and, in the instance of very old fish, frequently hooked. The upper jaw extends to the rear margin of the eye. Triangular in shape, the vomer (front part of the roof of the mouth) has a crosswise series of teeth. On the shaft of the bone are two alternating series of strong teeth.

Head, body, dorsal fin, and adipose fin are marked with numerous red and black spots. Circular, and sometimes X-shaped, the black spots frequently have a pale border. On the front of the dorsal and anal fins, and the outer portion of the ventral fin, a yellowish margin is usually to be observed. Few black spots are to be found beneath the lateral line on the brown trout. Food and locality are determining factors in the body color, which is brownish or brownish black.

****

SALAMANDER!!

Thoughts of a rescue from drowning flashed through the mind of Warden J. H. Simmons, Rochester, when he heard a woman scream while patrolling Little Beaver Creek last summer. Rounding a bend in the stream, he saw a feminine angler, not drowning as he had supposed, but preoccupied in the inspection of a 22-inch water dog, or salamander.

According to Simmons, the feminine dsiciple of Izaak Walton derived as much thrill in landing the water dog as many fishermen find in taking a fine bass.

****

VARIETY IN FISHING BOARD'S OBJECTIVE

By

M. A. RILEY,
Member, Board of Fish Commissioners.

Variety in fishing means the maximum of sport for anglers on Pennsylvania's streams and lakes. Only through a diversified program of fish propagation may the Fish Commission meet the varied demands of more than 250,000 licensed fishermen. Trout, brook and brown, black bass, pickerel, wall-eyed pike, catfish, sunfish, yellow perch, and suckers share the affections of our anglers, and provide variety in abundance during days astream.

Balance in aquatic life, that is, presence of a number of different species in a body of water is recognized as highly essential to the productiveness of stream or lake. Nature has ordained that the various species of our fresh water fishes be dependent to a certain extent upon one another. Bullhead catfish and suckers, for instance, are bottom feeders, relying upon a source of food supply that might otherwise be wasted. Black bass, pickerel, and wall-eyed pike take their food from the minnow schools, crawfish, stone catfish and other types of forage fish. Because they constitute such a vital portion of the game fish diet, many species of minnows are highly productive. Sunfish, yellow perch, and rock bass, while they take some toll from the minnow hordes, also feed readily from the surface near the shoreline, where insects frequently fall to the water.

From the angler's angle, variety in fishing in our lakes and streams, has another important feature. Our fish laws permit that every day in the year, Sundays excepted, fish of one species or another may be legally caught by licensed fishermen in this state. This means that on a mild day in winter, when an angler feels the fishing urge, he may take rod and line, find a good place for sucker fishing, and have a fair chance of making a catch. May and June, ideal months to spend days astream, find fishing for bullhead catfish, yellow perch, sunfish, or fall fish an attractive sport.

For the trout fisherman, many of our colder streams afford not only splendid brook trout fishing, but frequently yield catches of big brown trout, and occasionally a rainbow. The bass fisherman, when he finds the bronze warriors not striking his lures, may have sport on many of our bass streams in angling for scrappy bluegill sunfish, rock bass, fall fish, or yellow perch.

An increasing number of anglers are fishing each year for carp. In a few of the lakes in northwestern Pennsylvania, the muscallonge, often termed "tiger of the fresh water", challenges the fisherman's skill.

Still fishing in a quiet eddy for suckers, or casting fly for trout in meadow or mountain stream-- the angler's sport ranks second to none in the out-of-doors. That sport may best be served by stocking, as the Fish Commission is now doing, with fish of the various species.

****

MONARCH OF THE POOL

Lurking in the shadows of a deep pool in Horse Valley Run, Perry county, is a giant trout that has challenged the skill of anglers, writes Warden C. V. Long, of East Waterford. For three years, the big fish has held sway over its lair. Long estimates its length at about 24 inches, and says that it apparently has not increased in size during that time. The trout is extremely shy, darting to its hiding place beneath an overhanging rock when slighly disturbed.

****

SALAMANDERS SPAWN
IN LATE AUGUST; MALE
GUARDS NEST OF EGGS

Crawfish constitute a major item in the diet of salamanders, otherwise known as hellbenders, water dogs, or mud puppies. The male takes a leaf from the spawning habits of the black bass, guarding the eggs, but - if he wasn't a slow feeder many of the eggs would never hatch for he consumes them while standing guard. The flesh of this strange creature of our inland waters tastes not unlike the flesh of salmon.

These highly interesting sidelights on the salamander were presented in a paper read before the January meeting of the Venango County Science Club by David C. T. Swanson, of Polk. Mr. Swanson backs his studies in ichthyology with much knowledge gleaned at first hand from the subjects of his research.

"That repulsive looking creature, the hellbender, commonly called creek alligator and water dog," he writes, "is a very common salamander in parts of the Allegheny and its tributaries. While to many fishermen, the thing to do when getting one hooked is to cut the line, and to many others he is a serious menace to fish and should be exterminated, to the nature lover he is an interesting specimen. He is not only the largest salamander in the western hemisphere, but his only near relative lives in Japan. This relative grows to a length of five feet or more and is considered very palatable by the natives. As my brother Luther makes a study of snakes and amphibians, and as I am interested in ichthyology, we happened to become acquainted slightly with the hellbender and decided to find out for ourselves if he was an enemy to the fish, therefore to the fisherman.

"We started by looking up all available material at hand on hellbenders. We found that Mr. Graham Netting, of the Carnegie Museum, had stated in 'Copeia' for April 30, 1929, the results he obtained from three specimens he caught in Wolf Creek near Slippery Rock, as to food. He discovered that they had eaten 41 crawfish and two stone catfish. We then decided to operate on a few hellbenders ourselves.

"In three trips after hellbenders we limited ourselves to the 'Big Sandy' in Venango county. Our first trip was to secure some specimens for the Carnegie Museum Collections. This trip was on May 23, 1932. On the trip we caught eight adult specimens ranging from 16 inches to 20 inches in length. One of these appeared to have been dead for some time. We had these specimens two days (alive) before shipping them and in that time they had regurgitated 35 crawfish.

"Our next trip was on June 25. This time we had two secretaries with us, my sister, Miss Eva Swanson, and Miss Ethel K. Sutherland, a high school teacher of Chaffee, Missouri. They aided us greatly in counting eggs and taking notes. Formerly, we either snatched the hellbenders with hook and line or used a net, but we found that the best method was catching them with our hands. We had decided to catch and examine 25. We quit at 27, ranging from 15 inches to 22 inches in length, and from a rusty red to a dirty gray, almost black, in color. Luther did the operating. No vegetable matter was found in any of them. Three had empty stomachs, all the rest had the remains of from one to five crawfish. Small stones were found in three specimens. One had eaten a sucker about four inches in length. Another, a shiner of about two inches.

"We made another trip on August 15. Luther dissected five males and five females. Stomach contents disclosed but few crawfish and digested matter. As the season progressed we found less food of any kind in the hellbenders. It was in April that Mr. Netting noted many crawfish consumed by three hellbenders and in May when we observed the numerous crawfish regurgitated by these creatures. It is evident that waterdogs lose their appetite during the warm weather.

"We know there are quite a few hellbenders in 'Big Sandy', uet I don't know of any stream that has nearly as many fish or such a variety of fish. I wouldn't be a bit surprised that small fish eat hellbender eggs. The female lays her eggs around the first of September in long bead-like strings, anywhere from 400 to 900 eggs. I have used these eggs for bait and caught fish on them. It might be of interest to know that the male stands guard over these eggs and consumes quite a few of them, but as he is such a slow eater, many of them are hatched out before he can consume all the eggs.

"Dr. C. A. Darling, of Allegheny College, in a letter to my brother states that the flesh of the hellbender tastes something like salmon, and that there is no reason why they should not be as good as frogs to eat! In the course of time the revulsion now felt for them by the average person may be overcome and they will be prized as food."

****

STREAM IMPROVEMENT CLUB'S OBJECTIVE

Improvement of trout streams in Blair county, through construction of dams and retards, will be a feature in the program of the Bellwood Sportsmen's Association, according to Warden Lincoln Lender of Bellwood.

The association, organized recently, plans to better trout fishing on Bell and Shaw Runs by building retards and repairing several old splash dams on the streams.

****

PREFER NORTH BRANCH FOR BASS FISHING

Bass fishing is a hobby with Mr. and Mrs. Charles Welteroth, of Kingston, who have lured the battling bronzebacks from waters in many sections of the United States and Canada. But when it comes to sporty bass fishing, according to Warden Russell J. Womelsdorf, of Kingston, they declare that the North Branch of the Susquehanna River tops every stream they have ever tried.

It is an appealing bass water, in their opinion, nothing marring its winding beauty. Riffles and eddies are mixed in just the right proportion, inviting fly or bait. Eight seasons of fishing on the Branch have rewarded them, without exception, with fine creels of small mouth bass. On a number of occasions last season, each landed 10 bass. They favor helgramites and stone catfish as lures.

Mr. Welteroth in successive casts one day last summer caught two small mouth bass, one measuring 18 inches, the other 19½ inches.

****

HERE AND THERE WITH OUR ANGLERS

Two catfish, one weighing six and one-half pounds, the other fifteen inches in length, were caught in the Bellwood reservoir, on Bell's Run, Blair county, by W. W. Campbell, of Bellwood, according to Warden Lincoln Lender.

Falling snow does not cool the enthusiasm of sucker fishermen trying the Juniata River near Port Royal, according to Warden C. V. Long, East Waterford. Smoke from the fires of anglers was to be observed drifting upward through the snow flakes during a recent snowstorm, he said. Fine catches of suckers have been reported.

Catches of big bass featured the fishing contest conducted by the Schuylkill Valley Fish and Game Protective Association, at Phoenixville. Topping the small mouth bass division was the catch of George Updegrove, a four pound, three ounce small mouth, landed in Pickering Creek. Allen Bevan took first prize in the large mouth division with a fish weighing five pounds, seven ounces, caught in the Schuylkill River.

George Gardener, of Starbrick, caught 15 fine suckers and a yellow perch at Starbrick Eddy on the Allegheny River on December 17, according to Warden R. C. Bailey, of Youngsville.

A yellow perch, weighing one pound, 12 ounces, took first place in the perch division of the fishing contest conducted by the Lappawinzo Fish and Game Protective Association at Northampton. The perch was landed by Charles C. Herman in Promised Land Lake. Dr. Lloyd R. Seiler's catch, a five pound large mouth bass, topped the bass division. Ernest Benninger landed three pickerel in Lake Wallenpaupack, all weighing over three pounds.

Tioga county fishermen anticipate sucker fishing equal to that of last year in Crooked Creek, Marsh Creek, Mill Creek, and Pine Creek. Exceptional catches were made last season, writes Warden Horace P. Boyden, Wellsboro.

Joseph Cocklin, Bowmansdale, caught a fine pickerel at McCormick's Dam, on the Yellow Breeches, Warden Frank Sanda, Steelton, reports. The big fish, weighing three pounds, 12 ounces, was 26¾ inches in length.

The Lancaster County Fish and Game Protective Association at a recent meeting, according to Ira E. Mellinger, president, went on record as endorsing the hatchery and stream improvement program of the Fish Commission.

Do You Want Good Fishing?

—Obey the Law!

NOT TO BE TAKEN FROM
THE LIBRARY.

Vol. 2

PENNSYLVANIA
STATE LIBRARY

PENNSYLVANIA ANGLER

NEWS BULLETIN FOR FISHERMEN

FEBRUARY, 1933

P38.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. Deibler, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. Deibler, *Chairman*, Greensburg
John Hamberger, Erie
T. H. Harter, Bellefonte
M. A. Riley, Ellwood City
Dan R. Schnabel, Johnstown
Leslie W. Seylar, McConnellsburg
Edgar W. Nicholson, Philadelphia
Kenneth A. Reid, Connellsville
H. R. Stackhouse, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

Alex P. Sweigart,
Editor,
Harrisburg.

PENNSYLVANIA ANGLER
February, 1933

STREAM IMPROVEMENT NUMBER

THE FISH COMMISSION IN PENNSYLVANIA

(Part Two)

----

by

OLIVER M. DEIBLER,
Commissioner of Fisheries

HATCHERIES

The work of the Fish Commission may be grouped under three major heads - propagation, protection, and education. Propagation, including the Hatchery Service, Distribution Service, Field Service, and Research Service, is of basic importance in restocking our streams.

Under the Hatchery Service falls operation of the Board's hatcheries and construction of new plants. In the Fish Commission's efforts to promote good fishing, it is not catering to any special class of anglers, but is providing fishing for all classes with the result that our hatcheries are devoted to raising brook trout, brown trout, black bass, catfish or bullheads, sunfish, pike perch, yellow perch, minnows, and frogs. At the present time, there are in complete operation eight hatcheries. A trout-raising station has been established at Huntsdale, Cumberland county, and the site for a similar station purchased on Spring Creek, near Bellefonte, Centre county.

Pleasant Mount Hatchery, Pleasant Mount, Wayne county, is our largest hatchery and probably has under cultivation more water acres than any other hatchery in the United States. It is devoted to the raising of brook trout, yellow perch, pike perch, sunfish, pickerel, minnows, and black bass.

Erie Hatchery at Erie is a station located on Lake Erie. It is devoted to the propagation of pike perch and yellow perch for stocking our inland waters, and lake species such as pike perch, blue pike, white fish, cisco, yellow perch and others, for stocking Lake Erie.

Corry Hatchery at Corry, Erie county, is devoted exclusively to the hatching and rearing of brook trout. This plant is regarded as one of the most productive trout hatcheries in the east. Bellefonte Hatchery, Bellefonte, Centre county, is also a trout hatchery, maintaining a high rate of production.

Torresdale Hatchery, Torresdale, Philadelphia county, is located within the city limits and produces for distribution yellow perch, pike perch, sunfish, catfish, frogs, and minnows. This plant devotes a great deal of its work to producing the minnow which is utilized as forage in our public waters and also as food for bass held at Pleasant Mount Hatchery. Union City Hatchery, Union City, Erie county, is devoted to the propagation of yellow perch, sunfish, catfish, pike perch, and frogs.

Two new hatcheries have been constructed in recent years, the Reynoldsdale Hatchery at Reynoldsdale, Bedford county, which is used for production of trout and other species, and the Tionesta Hatchery, Tionesta, Forest county, a combination trout and warm water fish farm.

In the early days of Pennsylvania's fish cultural activities, the eggs of fish were hatched at the hatcheries and fish distributed to public waters when they were but a few days old. Probably for this reason, the term Fish Hatcheries was derived, as in fact they simply hatched the fish. But applying to our present institutions, the term Fish Hatchery is more or less a misnomer. They do much more than hatch the fish. For this reason, the term Fish Farm is more appropriate, because by present methods the brood stock is retained, the egg crop harvested, the eggs hatched, and the fish grown under artificial conditions until they are of a size well fitted to cope with conditions existing in our waters today.

Fish farming is not distinctly unlike any other branch of animal husbandry, except that we are specializing in a particular branch of aqua-culture. Efforts are constantly being made to increase production per given area, promote rapid growth, and practice selective breeding for size and disease immunity, as is the practice in other branches of animal industry. Selective breeding of the yellow perch at our hatcheries to promote size is looked upon as one of the outstanding accomplishments of modern fish culture.

At the hatcheries, no two species of fish are hatched, fed, and grown under the same conditions. Where a number of different species of fish are grown at the same hatchery, the hatchery superintendent must be familiar with the separate requirements of each kind and have available the different facilities for raising each variety. For example, we shall briefly outline methods of raising trout and bass. You will see that they vary widely in their requirements. However, before entering into the subject, methods of procuring the all important egg crop should be explained.

Eggs for artificial incubation are secured by different methods, depending upon the species. A method of artificial extrusion and fertilization is used for securing eggs of the trout. The brood fish are confined in ponds at the hatcheries and at the approach of, and during spawning season, the females are examined every few days to determine their condition as to ripeness, or in other words to find out if they are ready to give forth their eggs. This condition is determined by the sense of touch of the attendants. Generally, when fish are ready to give forth their eggs, their abdominal walls will be soft and pliable to the touch. When they are in this condition the eggs are squeezed from them by exerting with the hands a gentle pressure, beginning well forward and moving along the ventral surface toward the tail. After the eggs have been extruded from the female, by manipulating the male in the same manner, the milt or spermatozoa is poured over the eggs. The fertilized ova are then transferred to artificial hatching devices or incubators. If properly carried out, artificial extrusion of the eggs does not injure the parent fish.

Artificial extrusion of eggs in some species is not practical. When this is the case, as with the yellow perch, the parent fish are permitted to deposit their eggs in the natural way on artificially constructed spawning beds. The eggs are then collected from the beds and transferred to artificial hatching devices.

In the case of some species of fish, as the sunfish and bass, neither artificial extrusion or collection of eggs is practical. This is because of the peculiar habits of these species and the adhesive or sticky quality of the eggs. When this is the case, at the approach of the spawning season the parent fish are confined in ponds where conditions have been made as natural as possible.

The parents are then permitted to build their homes or nests, to deposit their eggs therein, and to care for them and the very young fish in their own way. When the fry, or baby fish, no longer require parental protection, the young are removed and placed in nursery ponds where they can receive the food and attention they require.

Following is an outline of methods employed in the raising of trout. The plant must be equipped with hatchery buildings, brood ponds, nursery ponds, and rearing ponds. In the brood ponds, the parent fish are retained year after year, for the purpose of producing the egg crop. Brook trout reach sexual maturity at the age of twenty-two months and after that they reproduce once a year, usually between October 15 and November 15. As spawning time approaches, males and females are separated to eliminate to a certain extent, fighting among the males at this period when the females are present; to have the males where they are easily obtained when needed and to eliminate unnecessary handling of the males during the sorting of the females to determine their condition as to ripeness. A female will produce from 150 to 2,000 eggs, depending upon her age and size. After the ripe females are removed, together with a proper number of males, they are transferred to the buildings and held in spawning pens, convenient for the spawn takers to catch them in their hands. The eggs and milt, or spermatic germs of the male, are extruded into small pans by the spawn takers in the right proportion to insure a high percentage of fertilization. This operation is repeated until the pan is full of eggs and milt. Surplus milt is then carefully washed from the eggs and they are placed in the hatchery building on specially constructed wire trays or baskets, which are suspended in troughs of running water.

The eggs are now ready for the process of incubation which requires from forty-five to ninety days, depending upon natural temperature of the water. It is needless to say that during this period the eggs require constant attention of trained men. At different stages of their development they require different handling. During the process of development, the unfertile eggs will turn white. These must be removed daily to prevent contamination. To avoid smothering of the eggs, excessive amounts of sediment must be removed from time to time, and at certain periods the position of the eggs must be changed to insure healthy development of the little fish. A fertile trout egg is more or less translucent and at near approach of the hatching period, the baby fish can be seen within the shell, constantly moving, endeavoring to break out. When this is accomplished, the tiny creature drops through a specially constructed wire tray to the bottom of the trough from which it is transferred to the indoor nursery trough and placed on beds of clean, washed gravel. The baby fish take no nourishment through the mouth from the first fifteen to forty-five days, but subsist from the contents of a yolk sac attached to the lower portion of their body. As this sac is gradually absorbed, they are constantly gaining in strength, so that by the time the food sac has disappeared they have sufficient strength to swim actively about and face the water current, which is an indication that additional nourishment must be provided.

At our hatcheries, the food of baby brook trout consists of finely crushed sheep's liver and clabbered cow's milk. In preparing crushed liver, all coarse fibers are removed by a washing process and the greater portion of the liquid is taken from clabbered milk. Feeding of the young fish at this time is an exacting task, requiring skilled and observant attendants. It appears that the chief mission of the little fellow's life is to eat. The attendants must satisfy this appetite in order to promote a rapid and healthy growth and still not allow any great amount of food to settle to the bottom of the troughs, where it could cause contamination if not promptly removed. In order to bring this about, during the daylight hours the fish are fed constantly, that is, attendants walk from trough to trough, scattering at frequent intervals, a small amount of food in each trough.

287927

During their stay in nursery troughs, the best of sanitary methods are practised. Dead and weak fish, uneaten particles of food and other foreign substances are removed daily. From two to three times each week the sides and bottoms of the troughs are thoroughly scrubbed. This is necessary in order to combat epidemic.

The fish are kept in the buildings and are cared for in this manner until they are taught to feed and until the weather becomes settled in the spring. They are then transferred to outside nursery ponds. After being transferred they are fed on practically the same diet until they are nine months old. Then their diet is changed to the food of the adult, that is ground heart, liver, and lights of the sheep.

(To Be Continued)

SUGGESTIONS ON IMPROVING STREAMS

by

C. R. BULLER,
Deputy Commissioner of Fisheries

Stream improvement, to be most effective, should be limited to waters that maintain a good flow during the entire year. It is of little avail to carry on an improvement project on streams that become dangerously low, as waters of this type maintain little or no life. When seriously affected by drought, a stream is denuded not only of a great part of its fish life, but is also robbed of aquatic organisms and plants vital in nature's scheme.

If dams or retards are constructed, they should be made as permanent as possible. The principal value of dams is to increase the natural range of fish and to provide refuge during unfavorable stream flowage periods. One or two well constructed dams capable of maintaining a suitable water level during drought periods are of more value than ten or fifteen poorly constructed dams.

Improperly constructed dams leak and landlock the fish in low water in such a manner that they cannot get up or downstream to find a more suitable area. It is suggested that before sportsmen spend time and money in stream improvement, they contact the Fish Commission as to whether or not the stream in mind warrants improvement work and is on our approved stocking list.

****

CATCHES MUSKIE IN STEEL TRAP

A rusted hook and strong copper wire leader bear mute testimony to an unusual capture of a muskellunge; Warden W. E. Briggs of Erie, who reported the incident, sent the hook to back the story.

On the morning of January 10, Harley Titus, Union City, R. D., visited a number of traps that had been set along French Creek, about one mile west of Wattsburg. In one of the traps, set at the juncture of Henry Brook and French Creek, he found a struggling muskie, measuring 45 inches in length and weighing 17 pounds. The condition of the hook embedded in the throat of the fish, would indicate that it had been hooked by an angler some time before, but had succeeded in breaking away.

Briggs advances a theory that the muskie had nosed into the trap, springing it. Apparently the trap jaws had fastened to the wire leader dangling from its mouth, since they could not hold the head of the fish. An interesting sidelight to the catch is the action of acid from the fish on the hook. The steel was partially dissolved by this acid.

****

SEWERS OR FISHING STREAMS?

by

KENNETH A REID,
Member, Board of Fish Commissioners

It has been estimated that of Pennsylvania's many thousand miles of splendid waterways, eighty-five per cent are polluted by man's activities to a greater or lesser degree. To state it very conservatively, at least fifty per cent of this pollution is absolutely unnecessary and has no justification whatever. Yet this very pollution, that is treated so lightly by the public, is the greatest single enemy to fishing in Pennsylvania - in fact, greater than all others combined. This reduction of potential fishing water through the agency of pollution is primarily responsible for congested fishing conditions existing in most parts of Pennsylvania, which in turn make the problem of good fishing more difficult for the Fish Commission.

Not only are the great majority of our waters out of the picture as potential fishing waters by reason of existing pollution, but those that are now fishing streams and being stocked by the Board are in constant jeopardy of being polluted at some future time under the existing pitiable status of the enforcement of our anti-pollution laws. Contrary to general belief, we have now and have had for some time, fairly adequate laws against pollution. The trouble lies in the fact that enforcement acts for the administration of these anti-pollution laws are entirely inadequate so that these laws have been inoperative and ineffective. To make a comparison for the sake of illustration, the situation is similar to the case of a hunter going afield in an excellent game territory with a splendid gun, but without any ammunition to put in this gun. What we need primarily is "ammunition" to enable existing legislation to hit the mark for which it was created.

For a number of years past, sincere efforts have been made by honest conservationists in each session of the Legislature to have the necessary bills passed, but each time they have been killed by the polluting interests. The Pennsylvania Division of the Izaak Walton League of America has always figured prominently in this campaign for pure streams, and together with many other sportsmen's organizations, they will introduce again in the present session of the Legislature a bill alomg the lines of the old McCrossin Bill of the 1929 session. The support and passage of this bill is vital to the future of fishing in Pennsylvania, and to this end hundreds of petitions have been circulated throughout the state which will be presented to the Legislature. It is hoped to get a million signatures on these petitions, which may be secured from Dr. Edward M. Gramm, 1930 Chestnut Street, Philadelphia.

Pennsylvania presents a picture of a strange paradox in conservation. Throughout the length and breadth of the United States she is held up as a model in conservation accomplishment. Under the control of the Department of Forests and Waters, the State now owns more than a million and a half acres of State Forest land. The hunters of Pennsylvania own nearly 350,000 acres purchased for them by their Game Commission with funds derived solely from their hunting licenses. The fishermen of Pennsylvania own nine splendid hatcheries whose combined output of fish easily exceeds that of any other state in the Union, and like the State Game lands, these are acquired and supported entirely from revenue derived from fishing licenses. We can talk about our iron and steel, our coal and other industrial products, but when one travels widely about the United States, and even in foreign lands, he soon finds out that what Pennsylvania is really famous for outside of her own borders is her accomplishments in conservation, and particularly the internationally known "Pennsylvania Game System." As evidence of these facts within the last biennium, representatives of eighteen states have contacted the Game and Fish Commissions and made a survey of Pennsylvania's unique system with a view to modelling their own after it.

Now let us look at the other side of the picture and see where the paradox comes in. Visualize, if you please, nearly two million acres of State Lands on which the forests and the game are being intelligently managed. One of the primary purposes in the establishment of the forests was to afford protection to the watersheds which would assure an adequate supply of water in the future for citizens of the Commonwealth. Yet through the midst of some of these forests run streams so vilely polluted that their water cannot be used by either fish or human beings. What is the sense of protecting and conserving watersheds if water is to be rendered valueless by reason of uncontrolled pollution? Such is the picture of the paradox in Pennsylvania conservation - and it is one that every citizen should be ashamed of and interested in correcting. If the millions of dollars that are spent annually by municipalities and industry in elaborate treatment of water from our polluted streams to make it safe for human and industrial use were spent in treating this pollution at its source, the problem would be well on the road toward solution, and the expenditures could be classified as capital investments, bearing interest in the cause of pure water, instead of annual expenses in the treatment of a perennial patient.

In the beginning of this discussion I stated that at least fifty per cent of existing pollution "is absolutely unnecessary and has no justification whatever." Without attempting to defend any pollution, I believe the problem should be approached in an orderly manner and that the first step should be the correction of that pollution that is entirely unwarranted from any viewpoint.

A study of the problem places the types of pollution under three different heads: First, individual or "petty" pollution, such as the common practice of throwing old tires, boots, bed springs, and whatnot into our watercourses. Also the practice (sometimes even indulged in by fishing cottages or clubs and frequently by country schools) of building outhouses on the bank of a stream. In the same category is the practice of some small hamlets of dumping their garbage by the truckload off a nearby bridge that spans an otherwise unpolluted trout stream. Such instances are plainly inexcusable and their solution is largely a matter of public education in decency and cleanliness. Our Public Schools could well give serious consideration to their responsibility in eliminating this unjustifiable form of pollution.

Second, municipal sewage pollution. There is little to be said on this subject as the case is a plain one. The dumping of raw sewage into our streams through open sewers is clearly illegal, but the progress of installing modern sewage disposal plants by Pennsylvania towns and cities has been woefully slow. An enlightened public with a firm belief in the wisdom and fairness of the Golden Rule would quickly speed up this program to completion.

Third, industrial pollution. This classification covers a multitude of sins - coal mines, tanneries, paper mills, chemical plants, textile mills, canning factories, dairies, and many others. For most of them there are tried and proven methods of disposing of their wastes at a reasonable cost. For a few, the problem has not yet been solved. If half the money spent in rendering polluted water fit for use were spent in research and development of treatment plants for correcting pollution at its source, the problem of pure water would be much nearer solution.

While holding no brief for industrial pollution, which is usually the most serious and concentrated of all forms, I think it is high time for the people of Pennsylvania to revise their ideas that watercourses are graves for all undesirable things and begin right at home in their cleanup campaign. When we have clean hands as individuals and as corporate groups by correcting the first two types of pollution, we can with much better grace demand that industry cease polluting our waters.

In the meantime there is a large field that needs only intelligent and concerted action for accomplishment. There are many hundreds, if not thousands, of abandoned industries in Pennsylvania that are not furnishing employment or any income to a single individual, but which are nevertheless polluting many hundreds of miles of streams to the detriment of many thousands of our people. The greatest single example is that of abandoned coal mines. Sufficient research and actual tests have been made along this line definitely to determine that the great majority of these mines can be effectively sealed so that the water issuing from them will no longer contain a serious acid content.

With the method known, it only remains for an aroused public to demand that this wasteful and unnecessary pollution be stopped. In many cases the owners cannot be found or are in no position to do the job. The state will eventually have to do it, and considering the fact that the pollution from these abandoned industries affects a large proportion of her citizens, I think it entirely proper that the State should correct this nuisance.

****

HIGHER WATER TEMPERATURES AND THE BARBLESS HOOK

Not only trout, but pickerel, native to warm water streams and ponds, are frequently injured when handled during summer months. This fact is directly attributable to higher temperatures in trout streams and warm water streams and ponds, than those existing twenty years ago. Fungus and other parasitic diseases thrive in high temperature water, attacking a slight break in the skin of an injured fish and frequently killing it.

It has been found that pickerel, with the possible exception of the golden shiner, are more easily injured by handling and bruising than any other fresh water fish. Furthermore, it is a recognized fact that the ability of a fish to overcome injuries is dependent to a large extent on water temperatures. Higher water temperatures diminish its chances of survival. By way of comparison, trout or other fish released from an ordinary hook twenty years ago had a better chance of recovery from a slight injury than they do today.

The barbless hook fits perfectly into modern fishing conditions, eliminating the possibility of injury through handling undersize fish. Any ordinary hook may be converted into a barbless by bending the barb flat with a pair of pliers.

****

A JANUARY BASS

Bass are generally conceded to go into hibernation, or at least an inactive state, during winter months. For this reason, the taking of a sixteen-inch smallmouth bass in the Conodoguinet Creek on January 22 is worthy of particular note.

John Spahr, of Carlisle, while sucker fishing near the Cumberland county seat, made the unusual catch, then released the fish. He reported the incident to Warden George James. The bass was caught at the juncture of Big Springs, a famous trout stream, and the Conodoguinet, equally famous as bass water. It is thought probable that the fish remained active owing to the higher winter temperature of water from Big Springs which flows into the Conodoguinet at that point.

****

SPORTSMEN COOPERATE IN STREAM IMPROVEMENT

by

DAN R. SCHNABEL,
Member, Board of Fish Commissioners

The movement to improve trout streams in Pennsylvania has gained state-wide impetus with our sportsmen. Reports of wardens in various sections indicate that the fishermen this year will play a prominent role in the drive for better fishing.

Typical of these reports is the following communication from Warden Russell J. Womelsdorf, of Kingston.

"I have been finding the main topic for discussion among fishermen this winter to be trout stream improvement," he writes. "Members of clubs and organizations realize the necessity of stream cultivation to make better trout fishing and plans now call for the building of dams and retards in an effort to improve present conditions on some of the trout streams of this section. A movement has already been started on Bowman's Creek by Paul Koval and Paul Kopac of Edwardsville. Several trees have been securely anchored across the stream by using heavy wire cable. They report that other members of their fishing club are enthusiastic about the work and expect to take an active part in building dams and retards."

This cooperation of the sportsmen is highly significant in the movement for better fishing. Betterment of stream conditions should go "hand in hand" with the output of fish from our hatcheries.

Three major factors should be considered in stream improvement:- increasing the food supply, providing greater protection, and improving feeder or tributary streams. Dams, retards, deflectors, and overhanging shelter to provide more shade and a larger amount of insect food are recognized methods of stream betterment.

The type of stream to be improved should determine the method to be followed. For instance, some of our trout streams run a slow current. It is obvious that to dam water of this type may result in injury to trout through warming it. On such streams, deflectors and increased shade are of primary importance. Deflectors, types of which have been described in former issues of PENNSYLVANIA ANGLER, serve a dual purpose on these waters, providing excellent cover, and, if properly constructed, speeding up the current. Michigan has successfully tried deflectors of various kinds.

Perhaps the most easily constructed types suitable to some of our slow current trout streams are the Boulder Wing and Log Wing deflectors. Proper placing of these improvements is of primary importance. They should be located at a bend of the stream, and so built that the force of the current be directed toward the right shore, if the stream curves to the left, or toward the left shore if the bend is to the right.

Construction of the boulder or rock wing deflector is not difficult. Large rocks may serve as a base, and if greater height is desired, the bed rocks may be placed two abreast. The deflector should extend to a point about midstream, rounded from its base at the shoreline to tip extending downstream. The largest rocks available should be used as a base for the deflector. Smaller rocks should supplement the main structure, the idea being to make it as watertight as possible.

Similar principles apply to the log wing deflector, which may consist of two logs, firmly staked, with rocks on the upstream side. From two to nine strong stakes may be used, and the logs, if possible, should be water soaked. If greater height is desired, other logs may be placed on the base structure. The projecting logs should be securely wired together at their juncture.

Increasing overhanging brush and foliage is of great benefit to trout in slower streams. The willow, apparently, is well suited to this type of stream improvement. Transplanting water cress on cold water streams also may be beneficial.

****

PIKE-PERCH AND PICKEREL

Pike-perch and pickerel vary to such an extent in appearance that distinguishing the two species is not difficult. They rank well as game fish, and have a fairly wide range in lakes and streams of Pennsylvania. Occasionally they are taken from the same water in trolling or casting. By preference, they strike at a moving bait, artificial or natural.

Spawning time for the pike-perch and the pickerel comes at about the same time of the year, early spring, just when the ice is leaving the water. Minnows and other small forage fish constitute a major portion of their food supply. The range of the pike-perch, however, is generally in deeper water than that preferred by the pickerel.

PENNSYLVANIA ANGLER offers the following descriptions of the two species.

PIKE-PERCH

The pike-perch is a fish of many aliases. It is variously known as wall-eyed pike, Susquehanna salmon, jack salmon, salmon, and yellow bass, and ranks as an excellent food fish.

Its color is a blending of dark olive and brassy, with the latter shade forming indistinct oblique bars. The sides of the head are somewhat vermiculated or irregularly lined, while the lower jaw is flesh-colored. The dorsal or back fin is spinous, with a large black blotch on the membrane of the last two or three spines, while the second dorsal fin and caudal or tail fin are mottled olive and yellowish. The base of the pectoral or breast is dusky. Coloration of the pike-perch varies in shade according to its range.

In body, the fish is somewhat spindle shaped. The back is broad, and a continuous lateral line is to be observed on the sides. Scales are small and rough-shaped. Cheeks, gill-covers and top of head are more or less scaly. The jaws of the pike-perch are about equal in length, and are armed with sharp conical teeth, crowded into velvety bands. Eyes are prominent, and located almost directly above the base of the mouth. They assume a glassy, gray shade after the fish has been taken from the water.

PICKEREL

The eastern chain pickerel, sometimes referred to as pike, is a voracious killer, taking heavy toll from smaller fishes in its range. Slender in shape, it lurks in coves of grass or lily pads, darting like an arrow at passing minnows or other forage fish. Greed and relentless pursuit of its prey have won for it the title "wolf of the fresh water."

The basic color of the pickerel is green of varying shades. In shape, it is somewhat compressed near the tail, having its greatest body depth from the anal fin to the base of the gills. The mouth is very large, its cleft equaling about one-half the length of the head. The lower jaw is longer, and both jaws are armed with coarse sharp teeth of different sizes. The tongue is also armed with a band of small teeth. The centre of the eye is located midway between the tip of the lower jaw and the rear margin of the gill cover.

A golden lustre is to be observed on the sides of the fish, which are marked by numerous horizontal dark lines and streaks. These lines are so joined that they form a chain-like appearance. A dark band is located below the eye, and the fins are plain.

****

ONE CAST - 50 CENTS

Having caught 844 black bass last season, and returned all but 32 of them to the water, H. P. Shawkey, Warren angler, holds a commendable record in Pennsylvania fishing. He typifies the sportsman who, while enjoying fishing, looks to the future of angling. In commenting on his experiences, he tells of a strange catch while fly fishing for trout last season.

Shawkey had made a cast, permitting the fly to sink to the bottom, in order to smooth out a kink in the line. When the fly rose to the surface, he noticed a small object clinging to it. Not a minnow, no indeed - it was a clip fastened to a half dollar.

****

TACKLE HINTS

Success or failure in landing big trout often may depend upon the tackle. For this reason, the time to check angling equipment is not when a coveted brook or brown trout rushes toward a snag, but during long winter evenings devoted to planning that trout fishing trip. Following are some timely suggestions on fly fishing tackle repairs submitted by Howard W. Morris, tackle expert, of South Greensburg.

The rod. Examine the fly rod carefully. In this checkup, particular attention should be given the windings, loosened ferrules, cracked or broken tip joints, or perhaps a guide that may be nearly worn through.

The line. First try the end of the line that was used last season, ascertaining that there are no weak spots. This may be accomplished by taking about two feet of line at a time between the hands, giving it a series of light jerks. The entire line should be checked in this manner. If weak spots are found in the portion used last season, the line may be reversed for use this year. But if doubt exists, a new line is perhaps the most logical solution of the problem.

Leaders. Last year's leaders are seldom trustworthy, if they were used during the season. Leaders that were not used may be given a test by soaking thoroughly in water, and then submitting them to a steady pull to determine their strength. Preparatory to starting on that fishing trip, it is advisable to soak two leaders thoroughly, placing them between damp layers of cloth in a leader box or paper wrapping. Weak leaders are responsible for the loss of many fine trout each season.

Flies. Selection of flies for a day astream is of first consequence. It is generally advisable to have at least two flies of the same pattern, and a number of different varieties of flies in the book. A number of strikes on an artificial fly frequently fray it, making necessary a change to a new fly.

The reel. A drop of oil in each bearing of a reel is usually sufficient to keep it in working order. More oil may spread to the line, with the result that a slight film of oil on the water will accompany each cast. Exceptional care should be taken in keeping water from the reel as grit and sand in water are harmful to reel bearings.

****

SNAPPING TURTLES MENACE FISH LIFE

Voracious, cunning in the pursuit of its prey, the snapping turtle ranks with the watersnake as one of the deadliest enemies to fish life in Pennsylvania waters. Lurking on bed of stream or lake, its upper shell in appearance not unlike a moss covered rock, the snapper strikes with amazing speed at a fish that swims above it. The swiftness of thrust of this reptile's head offers its victim little chance of escape.

In his research work relative to reptiles of the inland waters, Paul L. Swanson, of Wesley, has carefully observed the habits of the snapping turtle.

"The snapper (Chelydra serpentina)" he writes, "is the largest turtle native to Pennsylvania. It is sometimes called the 'mud turtle,' which name more appropriately belongs to a much smaller turtle that is very different in appearance. It reaches a weight of 50 pounds. The carapace, or upper shell is coarsely serrated on the rear margin, and in young specimens three keels give the shell a rough appearance. These keels become less apparent as the turtle grows, and old specimens have a rather smooth shell. This shell may measure as much as two feet in length in very old specimens. The lower shell, or plastron, is cruciform in shape and very small compared with that of other turtles. The head is large, with powerful hooked jaws. The tail is long, with two rows of scales beneath and a row of flat tubercles on the upper surface.

"It is found in ponds, marshes, streams and lakes all over the state, and does not often leave the water except in the case of the female, which hunts for a suitable place in which to lay her eggs in June or July. These eggs measure about an inch in diameter, are spherical in shape and white in color. The female burrows in the sand or soil until she is fairly well covered. After depositing the eggs she crawls away; dirt falling off her back into the depression usually leaves the eggs covered. Most authorities place the number of eggs at 20 or 30, but a large specimen caught in Minnesota by David Swanson and donated to Carnegie Museum, contained 64 eggs. In winter months the snapper hibernates. It often collects in large numbers, and according to one report, 26 were found in one muskrat burrow.

"The food of the snapping turtle embraces a good many different species of the animal kingdom. They have been known to eat small mammals, waterfowl, snakes, salamanders, frogs, tadpoles, fish, crayfish, insects, snails and worms. In catching waterfowl, they swim up beneath the unsuspecting bird, seize it and drag it beneath the surface to drown. They sometimes bury themselves in mud on the bottom of a body of water, and thus efficiently camouflaged, seize fish or other prey. One day I discovered a sucker over a foot long which had made the fatal mistake of thrusting its head into a paint can. Its pectoral fins were on the inside, and the lip of the can prevented the fish from ever being able to release itself. This sucker was swimming wildly about, a large piece of flesh missing from its side. When finally caught, the shape of the bite left no doubt that a snapper had taken advantage of the sucker's misfortune and procured for itself one good bite of fish. It may be supposed that such a voracious creature requires a large amount of food. According to a report in the October ANGLER, one captive snapper consumed from three to five pounds of fish daily. Fortunately it is very highly prized as food for man, perhaps its only redeeming feature."

****

DESERTED BEAVER DAMS REQUIRE MORE COVER

A method by which deserted beaver dams may be converted into ideal pools for trout has been suggested by James S. Berger, secretary of the Black Forest Conservation Association. Briefly, his suggestion is the planting of more willows in such areas to restore natural growth along the shorelines. His letter follows:

"The articlo appearing in the January issue of your publication, entitled "FOOD SUPPLY INCREASED BY STREAM IMPROVEMENT," brings to mind a condition existing in most of our Potter county trout streams and suggests a method of improving it. As all trout fishermen know, all but very few of our Pennsylvania streams are the locations of beaver dams, and the writer is particularly familiar with those of Potter, Warren and Forest counties, where no stream practically is without one or more. Without commenting on the detrimental or beneficial effect of these dams upon the streams, it is a fact that when the food supply is exhausted in one locality, the beavers move to another site and establish themselves, leaving their former location stripped of cover for several hundred yards up and down stream. Most of these abandoned dam sites offer stream conditions, pools, eddies, and undercuts in which trout would thrive but for the absence of cover along the banks. Portions of the abandoned dams themselves form excellent pools, and but for exposure to sun and lack of overhang would be occupied by trout. Generally there are to be found close to such a stripped area abundant growths of willow, and anyone familiar with the stream which he is fishing will know the location of the abondoned beaver dam, and provide himself with a small bundle of shoots to place along the edges of the stripped portion. A little of this willow planting by many fishermen would soon result in an increased, or reclaimed, productive stretch of water."

****

HERE AND THERE WITH OUR ANGLERS

By way of suggestion, after reading PENNSYLVANIA ANGLER, pass it on to friends who like to fish. In this way, topics of interest to anglers in the bulletin will be readily available to our fishermen.

Sucker fishing in the Juniata Valley is in the limelight with anglers of that section, according to Warden C. V. Long, of East Waterford, Juniata county. A catch of 25 suckers on Christmas was made at the juncture of Jacks Creek and the Juniata River by James Malaniphy of Lewistown.

A sucker weighing five and one-half pounds was caught in Cocolamus Dam, Juniata county, by Russell Ausman of Cocolamus.

Perhaps the record carp taken from the Juniata last season was landed by B. C. Toner of Lewistown. The big fish was 31$\frac{1}{4}$ inches in length and weighed 30 pounds.

Heavy catches of suckers were made in French Creek and the Allegheny River during January, according to Warden J. H. Hall of Seneca.

The McKean County Sportsmen's Club voted to build dams and retards on the West Branch of Tuna Creek, Willow Creek, and Sugar Run, at their January meeting, writes Warden J. Albert Johnson of Bradford.

While patrolling the North Branch of the Susquehanna River between West Pittston and Ransom recently, Warden Russell J. Womelsdorf counted twenty-three fishermen. They reported excellent fishing and exhibited some fine catches.

In his annual message to the Lancaster County Fish and Game Protective Association, Ira E. Mellinger, president, advocated the building of dams and retards on streams and heavier fines for dynamiting, netting, or seining fish.

During this winter fishermen have been making some heavy catches of yellow perch, while fishing through the ice, in lakes and ponds in this section, writes Warden Russell Womelsdorf, Kingston.

Sucker fishing in McKean county, according to Warden J. Albert Johnson of Bradford, has been retarded by high and muddy water.

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PROPERTY OF THE
PENNA. STATE LIBRARY

PENNSYLVANIA ANGLER

NEWS BULLETIN FOR FISHERMEN

MARCH, 1933

P38.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. DEIBLER, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. DEIBLER, *Chairman*, Greensburg
JOHN HAMBERGER, Erie
T. H. HARTER, Bellefonte
M. A. RILEY, Ellwood City
DAN R. SCHNABEL, Johnstown
LESLIE W. SEYLAR, McConnellsburg
EDGAR W. NICHOLSON, Philadelphia
KENNETH A. REID, Connellsville
H. R. STACKHOUSE, *Secretary to Board*

**"Want Good Fishing?
—Obey the Law"**

ALEX P. SWEIGART,
Editor,
Harrisburg.

PENNSYLVANIA ANGLER

March, 1933

THE FISH COMMISSION
IN PENNSYLVANIA

(Part Three)

----

by

OLIVER M. DEIBLER,
Commissioner of Fisheries.

HATCHERIES (Cont.)

After the trout fry are removed from the buildings and placed in outdoor ponds, success of the operation depends upon a great deal more than simply feeding them. It should be recalled that they are being raised under artificial conditions, living in a crowded and unnatural environment, with a very restricted range, and subsisting upon artificial food. Fish under domestication are subject to probably as many different diseases as any type of domesticated livestock.

The hatchery superintendent must be constantly on the alert to guard against outbreaks of disease epidemics. In his morning survey of the plant, if a pond of fish is not fed properly or appears to be distressed in any way, the area is at once quarantined and the trouble diagnosed, usually by use of the microscope. The Board has remedial measures for a number of these diseases, while others still remain a mystery. It follows that the keynote to success is strict practice of prophylactic measures at all times.

Under the Board's present policy, trout are not planted in our public waters until they have attained a length of from six to twelve inches. This means that many of them must be held at the hatchery until they are from twenty-four to thirty months old. Fish, like all other types of animal life, vary greatly in growth over a given period of time.

Trout are cannibalists by nature. In order to eliminate loss through cannibalism and to give slow growing individuals a better opportunity to thrive, all trout held for distribution are sorted at least twice each year, and each year's crop is graded into at least three sizes. After trout attain a proper size for stocking, they are taken to the shipping buildings and prepared for their journey to the public waters in trucks maintained by the Fish Commission.

Raising Bass

Artificial propagation of the black bass is one of the most difficult and expensive propositions confronting the fish culturist today. At the present time, Pennsylvania is distributing to suitable waters, hundreds of thousands of bass ranging in size from three to five inches. A few years ago this was thought to be impossible. It has been made possible through intensive research and practice by C. R. Buller, Deputy Commissioner of Fisheries. Pennsylvania's method of artificial propagation of the black bass has aroused great interest and is being carefully studied by fish culturists from many sections of the country.

Before outlining methods of producing the crop, some of the difficulties encountered and overcome in this work should be explained.

First: No artificial food is known that the adult brood bass will feed and thrive upon. In every instance that has come under our observation, where artificial feeding was resorted to, the parent fish died of disease or became barren the following season. This has made it necessary to propagate and feed them upon natural food such as minnows and crayfish, a tremendous task in itself.

Second: Bass of all ages held under artificial conditions are subject to disease, for which no practical remedial measures are known. The life history of the pathogenic organisms was studied and successful preventive measures taken for most of them.

Third: Baby bass start taking food through the mouth when they are about one-fourth of an inch in length. By the old methods employed, only a very small percent can be educated to take artificial food. The balance die in a short time from lack of nourishment. This handicap was overcome by artificial propagation and feeding of the daphnia, a variety of the so-called water flea.

Fourth: The black bass rank with the most voracious fish of our waters, with a marked inclination towards cannibalism. For several reasons sorting of the young fish is not practical during the summer months, with the result that by the old methods the bass culturists expected a loss of at least fifty percent through cannibalism. A new method of feeding to promote uniform growth has greatly overcome this handicap.

Fifth: After the baby bass had reached the adult feeding stage which is comparatively young, the cold storage products fed, such as coarse ground fish, lacked proper vitamins for their wellbeing. The culturists making a study of this work, knew that a portion of the natural food would probably supplement this want and the most logical food would be the live minnow. Therefore, they set to work to find a minnow that would adapt itself to the artificial propagation and reproduction at a proper season of the year when its offspring would be of a size that the small bass could consume when they most needed it. The golden shiner, a minnow found in many of our lakes and ponds throughout the Commonwealth was adapted and is being extensively propagated. A portion of the Pleasant Mount hatchery was set aside for this purpose and at the present time, all the bass are being raised at this station. The areas devoted to the bass work consist of storage ponds, brood ponds, rearing ponds and forage areas. The forage areas are divided into two parts, one consisting of the minnow propagation plant, covering approximately ninety acres and the daphnia nursery consisting of one hundred and ten daphnia beds.

Other than during the spawning season, the brood bass are stored in comparatively crowded conditions in the storage ponds and fed throughout the year on live natural food. At the approach of the spawning season, which is generally in late May or early June, the fish are carefully selected as to sex. A number of pairs are then allotted to each brood pond, in which conditions have been made natural for their nest building.

After hatching, the baby bass subsist from a yolk sac for a short time and as it is being gradually absorbed, they gain in strength and swim in a school in proximity to the nest, each day swimming nearer the water surface. At about the time they have sufficient strength to reach the surface they are captured in nets and removed to nursery areas.

The first food taken through the mouth of almost all baby fish living in a state of nature, is some form or other of the water flea. At this time the bass are very small and delicate and cannot be educated to take artificial food. A lack of nourishment at this critical period will prove disastrous, with the result that it is necessary to feed them upon the daphnia or water flea, that is artificially propagated in the daphnia nursery for this purpose. Pennsylvania long foresaw the value of daphnia in fish pond culture and worked constantly for a period of ten years before its culture was established on a practical working basis. During 1929, the daphnia nursery at the Pleasant Mount hatchery alone, produced an average of a solid bushel of organisms a day for a period of four months. The brood stock of the organisms are wintered under glass in heated buildings.

For the first few weeks, the baby bass at the hatchery are fed exclusively on the daphnia. Later this is supplemented by the live minnow and ground cold storage fish. When the bass become large enough to consume a small minnow, the crop of minnows is ready to be harvested in the minnow forage area and they are introduced daily as long as they last. The Board is not able to produce live forage in quantities sufficient to grow three or four hundred thousand bass to a size of from three to five inches. Therefore, other food consisting chiefly of the ground cold storage fish must be utilized. The feeding of this type of food appears to be largely a matter of education on the part of the bass. From the time they are large enough to consume a minnow they are constantly being fed and educated to consume the ground particles, so that by the time the minnow crop becomes scarce, they will readily feed upon other sources of food supply. The ground food lacks certain vitamins necessary for their well-being. For this reason, the daphnia, rich in the same vitamins found in codliver oil, is fed daily to offset this condition.

(To be continued)

A TROUTING THRILL

H. P. Shawkey, expert Warren angler, holds firmly to the belief that trout fishing offers splendid opportunity for nature study.

In fishing a favorite stream, he chanced to glance to the right, and saw a bear's head loom above a moss-covered log. Bruin sniffed the air inquiringly, and Shawkey's first concern was a survey of the ground between himself and the log to make sure that no cubs were present.

"When my gaze returned to the log," he writes, "that bear was preparing to stand up; she raised her head up, and up, and up, like a jack-in-box, aimlessly waving her paws, until it seemed she would reach high heaven. Nothing to be afraid of in the maneuver, however, so I went upstream about fifty yards, unleashed my rod, cast and drew in a ten inch trout."

****

FLY FISHING

by

KENNETH A. REID,
Member, Board of Fish Commissioners

Fly fishing is an art and a science that adds immeasurably to the enjoyment of the sport of fishing. If you have fished for years with bait, as many have done, and have not yet taken up the artificial fly, you have missed some added pleasures in your favorite sport that might as well be yours. On the other side of the picture, the general adoption of the artificial fly by Pennsylvania trout fishermen will mean more and better fishing for them the following year and in other years to come. The number of small trout killed annually as a result of the bait fishing method, over and above the much smaller number that would die were they caught on the artificial fly, would spell the difference between good fishing and poor fishing on many of our streams. As we are all interested in better fishing, let each one of us do his part to reduce this tremendous and needless mortality of fish we return to the water, by not only taking up fly fishing ourselves, but by encouraging others to do so.

There is no mystery about fly fishing, nor does it require any unusual skill. As in any other sport, there is a right method and a wrong method, and certain fundamental principles must be observed. Of course, the longer one casts the fly, the more expert he will become, provided he is started on the right track. On the other hand, I have seen men in a very few days' practice under the guidance of a good caster do better rod work than others who had been at it for ten years, but who never took the trouble to get started right or to discover and correct their faults. Let's get started right and thereby get the full measure of enjoyment from the sport.

The first requisite is to see that your outfit is suited to the type of fishing. You can't cast a fly with a steel bait casting rod - although I have seen some amusing spectacles on our streams of men attempting it. Nor can you cast a fly with any degree of success with a bait casting line, even though it be on the best fly rod in the world. The individual items of tackles must not only be suited to fly fishing, but must be suited to each other and the assembled outfit balanced in this respect. Otherwise the results are bound to be disappointing.

The usual rod for trout fishing with bait is really of the fly rod type; that is a long rod of from eight to nine and a half feet with the reel seat below the grip. The chances are that this rod will be satisfactory for fly casting - at least for a beginning. If you are going to buy a rod, I would advise one of eight feet, weighing between $3\frac{1}{2}$ and 4 ounces, preferably about $3\frac{3}{4}$ if with skeleton reel seat, and nearer four ounces if with metal reel seat. The old standard recommended for trout fishing has for years been nine feet, weighing five ounces, but you will get a great deal more pleasure out of the lighter eight foot rod, and it will not tire you after casting all day like the heavier ones are apt to do. In any case it should be a good grade of split bamboo.

If you intend fishing the smaller streams with the wet fly, an F level enamelled silk fly line will be about right for the eight foot rod. For dry fly fishing on the larger Pennsylvania streams, an HEH tapered line will be better, but such a line is a liability on small streams where only short casts are made, for the very good reason that you must get several feet of the heavy belly of the line

beyond the rod top before there is sufficient weight to develop the rod in casting, and this does not happen with a tapered line until after you get your fly out twenty or twenty-five feet.

Fairly good fly reels may now be had for as little as two or three dollars. The fly reel is probably the least important item, but it should not have a projecting handle that will foul the line. The single action disk type about three inches in diameter with narrow spool is best. Such a reel should weigh about five ounces to properly balance the eight foot rod. Don't waste your money on expensive agate or chrome line guards on the reel. They are entirely unnecessary, if not actually a detriment to even spooling of the line. On the other hand, an agate or chrome steel first guide and top on the rod are highly desirable.

Leaders and flies furnish subject matter for endless discussion. The usual leader is either three or six feet. Personally, I seldom use one less than seven and a half feet, and frequently in low water, considerably longer. For dry fly fishing, they should be tapered. On flies, I will merely suggest that the sizes in the wet variety should range from eight to twelve, and in the dry, from 10 to 14. Special conditions may occasionally require sizes larger or smaller. On dry flies, look well to the hackles - they should be fairly stiff and at right angles to the shank, or even pointing slightly forward. If they are soft and slant back toward the point of the hook, the fly will not float, regardless of what the maker claims for it.

In the November number of the PENNSYLVANIA ANGLER, I gave a brief description of the fundamentals of casting, which might well be repeated here. Now as to casting, get this point firmly fixed in your mind; your dry fly has no appreciable weight, and therefore it is the weight of the line that carries it out and makes casting possible. The majority of beginners are trying to cast with a line entirely too light, and the average small town tackle store does not carry a line in stock heavy enough for even a four ounce rod. Another point to remember is that fly casting is largely a matter of correct timing. Finally, remember that the spring of the rod plays a large part in propelling the line; don't overwork yourself.

If you are a rank beginner, start practicing on the lawn. Lay the rod flat on the ground and draw off about twenty-five feet of line, for you must have something to start with. Then pick up the rod, and holding it in approximately horizontal position, proceed as follows: 1. Raise the rod to about 60 degrees to overcome the inertia of the line and start it moving toward you preparatory to the real back cast. 2. Don't stop, but accelerate the movement with a smart switchback of the rod and stop it abruptly just back of the perpendicular (about 20 degrees). 3. Pause for the line to straighten out behind you. 4. Bring the rod forward and downward with a smart chopping motion and stop it abruptly slightly above the horizontal. 1, is the "lift", 2, the back cast, 3, the pause, and 4, the forward cast. The lift and back cast are merged into one smoothly accelerating motion, and the forward cast should be started slowly and ended with a snap.

The common faults to guard against are: 1, Too much of a jerk at the start of the backward and forward casts. 2. Rod too far back at the end of the back cast. If you try to stop it at the vertical, you will likely succeed in stopping it at the proper angle, about 20 degrees behind. 3. Insufficient pause for the back cast to extend itself behind you. Practice will enable you to feel a slight tug of the line, which is the signal for starting the forward cast.

After you have mastered the fundamentals, practice shooting the line, which consists of stripping off a few feet between the reel and the first guide with the left hand and letting it go at the proper moment as the live forward cast is extending itself out over the water. Strip in this line just before you start the lift at the beginning of the cast and hold it in the left hand until the forward cast is nearly completed, when the pull of the live line will pull this extra line out through the guides. A little practice will tell you the precise moment to release the shoot, and you will find it an invaluable aid to delicacy and accuracy as well as enabling you to increase your casting range by that amount of line.

In casting the dry fly, do not cast your fly directly at the spot on the water where you wish it to alight. Cast for an imaginary object about a yard directly over it. Then when the cast is completed, the fly will fall lightly to the water instead of slapping it. Fish upstream and study the currents as you go in order to have your fly float as naturally as possible, free from drag by the leader or line. Do not impart motion to it after it has touched the water. With the sunken fly, it is often advisable to impart motion artificially, but with the floating variety, it should float naturally wherever the current chances to take it.

With the dry fly it is important that the line be well greased so that it will float on the surface. A line that sinks is an abomination. The fly should also be treated with an oil to aid its buoyancy. Contrary to the usual advice, I frequently grease my leader when fishing fast heavy water where every aid to buoyancy is needed. The higher the fly floats, the more effective it is likely to be.

I have stressed casting ability because it is one of the essential fundamentals to successful fly fishing. It is important with the wet fly, but doubly so with the dry fly. A good caster can reach many fish that the poor one cannot, and will take many fish within the range of the latter that refused the clumsier offering. While I am not one of those individuals who claims that he doesn't care whether he catches any fish or not - such a man is either a liar or else he does not have the real fishing spirit - I do maintain that the accomplished dry fly caster derives much pleasure from casting well and watching his fly float daintily on the surface that is missed in other forms of fishing - and when strikes are few and far between, this is an asset worthy of consideration.

****

RULING ON BURR HOOKS TO BE CHANGED IN 1934

While three burr hooks of three points each may be used on a plug bait in Pennsylvania waters this year, after January 1, 1934, such use will be illegal. Under provisions of the inland water law, the Board of Fish Commissioners on January 1, next, will issue a ruling prohibiting the use of more than one burr hook of three points on a plug bait or three single hooks on such a bait. To be within the ruling, a plug bait after the first of next year must not have in excess of one burr hook or three single hooks attached. Use of a treble hook in some adjoining states is prohibited at the present time, and entails a fine of twenty dollars.

****

"HEAVIEST" CATCH

A catch that carried away hook and line "down where the Conewago flows" will linger for many days in the memory of D. J. Forney, ardent Gettysburg angler.

Some years ago, he writes, while I was fishing in the Conewago west of the Twin Bridges, with W. J. Nelson and J. J. Kerrigan, (both of these gentlemen would rather fish than eat), I had a rather unusual experience.

We were wading, live bait casting, and came to water too deep to navigate, so gathering up my paraphernalia, I took to the shore and made my way up a steep bank which was covered with a dense growth of bushes, through which a narrow cattle-path ran.

Well, along about halfway through the brush, I met up, head-on, with an overgrown, stubborn, but friendly bull, who for sometime refused to move. The path being too narrow to pass him, I had to persuade him to turn about, which I finally succeeded in doing, but he again refused to move in spite of some gentle kicking and cussing on my part.

Meanwhile, my bait were suffering, so without considering the possibilities, I jabbed him with the end of my rod, the line having been reeled in, so that the hook was fastened in the tip; this portion of the rod skidded off his leg to the left, and hooked him "somewhere"; and as "Hollywood" would say, we had action.

In the next five seconds, he took more line, in quicker time than the biggest fish I ever caught, and you may know I didn't try tiring him out. Neither did I ever see him or the line again.

****

THE BLACK BASS

The surging rush of a black bass in pursuit of minnows typifies this game fish superb of Pennsylvania's inland waters. There is in its savage strike and unyielding, spectacular battle to break from the hook, a note of challenge to angling skill.

The late Dr. James A. Henshall, eminent authority on fish and fishing, wrote concerning the black bass: "I consider him, INCH FOR INCH and POUND FOR POUND, the gamest fish that swims." Certainly any angler who has fought a two-pound bass into shallows or landing net, thrilled to its maddened runs and savage breaks from the water, must regard this fish with admiration and respect.

While both smallmouth and largemouth bass are caught in Pennsylvania, and occasionally the two species are present in the same range, they live by preference in different types of water. Good smallmouth range is generally in streams or lakes of rock and gravel bottom. On feed they seek shallow flats where minnows and other food may be readily found. A rock bottom is not always requisite for the largemouth bass, and this species is often abundant in ponds and lakes having mud bottom and heavy vegetation.

In distinguishing the smallmouth from the largemouth bass, the following suggestions should be helpful. The corner of the mouth of the smallmouth terminates at the front angle of the eye, of the largemouth at or slightly beyond the rear angle of the eye. Eleven rows of scales are present on the cheek of the largemouth bass, seventeen rows of scales on the cheek of the smallmouth. In younger specimens of the largemouth a distinct black lateral band is to be observed; this band becomes indistinct in older specimens.

Spawning time for the smallmouth and largemouth bass in Pennsylvania is the latter part of May and early June. Their spawning habits are somewhat different. The smallmouth bass builds its nest, a mound of pebbles, in fairly shallow water; in the instance of the largemouth, the eggs are scattered in some tiny cove of aquatic vegetation. The male parent of each species guards eggs and young fish.

In describing black bass, PENNSYLVANIA ANGLER would call attention of its readers to the fact that coloration may vary in intensity in different waters.

Description

The smallmouth bass (Micropterus dolomieu) is tapering in body, rather abruptly forward, its body depth increasing with age. The scales on its cheeks are tiny, while the body scales are also comparatively small. Its dorsal or back fin, like that of the largemouth, is spinous in front, merging into soft rays behind. The spinous portion is deeply notched, and the ninth spine is about one-half the length of the fifth. Pectoral and anal fins are soft and scaly at the base.

Coloration of both species is for concealment. In general, the smallmouth's coloration is dull golden green, tinged with a bronze lustre and often blotched with darker areas, particularly on the head. Darker spots on the sides of young smallmouth bass form short vertical bars, but no dark lateral band. Radiating from the eye across the cheeks and opercles, or gill covers, are three bronze bands. On the tip of the opercle is a dusky spot. The belly is grayish or white. The caudal or tail fin is black, tipped with white and yellowish at the base. Bronze spots or markings are to be observed on the dorsal fin, the edge of which is dusky.

In body, the largemouth bass (Micropterus salmoides) is moderately compressed, and, like its cousin, the smallmouth, it assumes greater body depth as it grows older. Scales on its body are proportionally large, and teeth are sometimes present on the tongue. The largemouth's general coloration is dark green above, silvery green on the sides. Three oblique dark stripes radiate from the eye across cheek and gill cover. Dark spots are present above and below the lateral line. The tail fin is pale at the base, dark and tipped with white. The ventral surface is gray or grayish white.

Habits

Smallmouth and largemouth bass are members of the family of Centrarchidae, which includes the sunfishes and basses. Strictly American fishes, their range is from the Atlantic Seaboard states to the plains of the Middle West, and from the Gulf states to waters deep in the Canadian hinterland. C. R. Buller, Deputy Commissioner in Charge of Propagation, whose success in bass propagation is regarded as one of the outstanding feats in modern fish culture, calls attention to successful introduction of bass to European waters.

Fish eggs are classified under two headings, adhesive and nonadhesive. Eggs of the bass are of the adhesive type, and a large percentage of young bass are hatched in a wild state when water conditions are favorable, that is, clear, fairly low, and of moderate temperature.

Preparatory to spawning, the male seeks a suitable location, preferably with protection on one side. This protection may be a log or rock. Any foreign substance is then removed, the male carrying it away in his mouth. Removal of sediment, through a swift motion of body and fins, is now accomplished. Spawning site ready, the male sets forth to entice a female to the nest. After spawning, the female departs and upon her mate devolves responsibility of caring for the eggs and young fish.

So adhesive are the eggs that they cling to anything they may touch. In consequence, it is necessary that they adhere to a clean surface. The female deposits from 2000 to 5000 eggs, dependent on her size and age. After spawning, the male, in addition to guarding these eggs, keeps the nest clean of foreign substance, and is extremely aggressive at the approach of another fish of any species. Here again, qualities that make him game fish peer of the inland waters come into play. Few, if any fish, can withstand the savage attack of a male bass guarding its nest.

The period of incubation for bass eggs is from seven to 14 days. When hatched, the baby bass are extremely helpless creatures, absorbing nourishment from a yolk sac attached to each fish. Gaining in strength, they swim nearer to the surface of the water each day, settling back upon the nest at night. Absorption completed, they move farther from the nest in search of food. At this stage, the male leaves them. A strange transformation occurs in the male parent after it deserts the young for which it would have readily sacrificed its life. Returning hungry to the nest in a few days, it will devour the fry with as little compunction as it might kill minnows.

The first food of young bass after they have passed the yolk feeding stage consists of tiny water organisms such as the daphnia, or water flea, cyclops, and cyris. True to the bass instinct, they are voracious feeders, and their growth is in consequence rapid. Minnows constitute the second important food source in the life cycle of the black bass.

In commenting on the habits of the adult bass, retained as brood fish at the hatchery, Mr. Buller explains that these fish must have their natural food or they will become barren. Late autumn must find them with an abundant surplus of fat and flesh upon which to draw, as they do not feed during the winter months. Nature dictates that bass in wild waters must also enter the winter in good condition. At spawning time, any sudden change in water temperature may interfere with the egg laying process, and in extreme cases might result in heavy loss to the bass crop.

Live food, moving food that darts through the water, or attempts to wriggle beneath stones or other cover on the stream bed, constitutes the forage of the black bass. It is killer and cannibal, swayed by varying feeding moods, a lunging, picturesque battler on any tackle - in brief, game fish to the core.

****

CATCHES WATERSNAKES ON LIGHT FLY-ROD

Trout in the famous Big Spring, near Newville, Cumberland county, were not rising to the fly one sultry day last season, and H. M. Askin, Harrisburg angler, decided to try a new type of angling. He had noticed a number of watersnakes basking in the sun, and determined to test their fighting qualities on a fly rod. Replacing the tiny feathered lures with two gut hooks, he started to cast.

Three snakes were hooked, landed, and killed in a short time. According to Askin they provided plenty of excitement while struggling in the swift current of the stream against the whippy spring of the light bamboo rod.

FACTS CONCERNING POISONOUS SNAKES

Editor's Note: The following article on poisonous snakes has been written for PENNSYLVANIA ANGLER by Paul L. Swanson, of Polk.

With the opening of trout season, thousands of anglers will enter the wilderness country of the state, and possibly some of them may have the pleasure of their trip marred by thoughts of poisonous snakes which they might encounter. To make matters worse, it seems to be a favorite topic of conversation when fishermen get together in the evening to tell snake stories, with particular emphasis on the rattlesnake. Some of these tales would make their narrators eligible to membership in the "Tall Stories Club." A more thorough knowledge of poisonous snakes and their habits would do much toward reducing the uneasiness felt by many when in snake infested regions.

A reasonable fear of rattlesnakes and copperheads (which are the only poisonous snakes native to Pennsylvania) is only sensible, and those who do not have a healthy respect for the menace of these reptiles are unwise, to say the least. They are quite capable of dealing serious injury or death. However, they are not plentiful enough to cause much anxiety to the angler. In cool weather at the beginning of our trout season, venomous snakes are rarely observed, as they have not yet emerged from the dens where they have been hibernating. Later on, in May and June, they may be discovered along the edges of some of our streams. As most fishermen wade in the stream, the danger from snakes is minimized, but when fishing small runs it would be well to keep an eye on projecting rocks which you pass.

There are only three species of venomous snakes in the state, the timber or banded rattlesnake, the copperhead, and the Massasauga, a small species of rattlesnake found in certain sections west of the Allegheny River. These snakes are all "pit-vipers," so named from the deep pit found between the eye and the nostril. If you wish to ascertain whether or not a Pennsylvania snake is poisonous, the presence of this pit proves definitely that it is. If the snake has the pit and does not have rattles, it is a copperhead. All three of these snakes have elliptical shaped eye pupils, in contrast with round pupils of all our harmless species. These features serve as more definite characteristics in identification than the stocky build and the "triangular head." In living specimens, one can readily identify the rattlesnake by its rattle and the copperhead by its distinguishing coloration. The so-called water-moccasin in Pennsylvania is a harmless, ugly tempered water snake. The poisonous moccasin is a southern species. The spreading-adder or blowing viper, more correctly the hog-nosed snake, is harmless despite the vicious looking front it displays.

The poison apparatus of the pit-vipers consists of two long, hollow teeth, which are hinged to the maxillary bone of the upper jaw. The bases of these fangs are connected to glands which resemble the salivary glands of mammals. These glands manufacture and secrete the venom. When not in use, the fangs are encased in a thick membranous sheath and folded against the roof of the mouth. In striking, they are projected forward, and at the finish of the stroke muscular pressure is exerted against the glands, forcing venom through the hollow fangs. The fangs are shed from time to time and reserve fangs quickly take their place, so it may be seen that extracting the fangs only temporarily inconvenience the snake. A snake need not be coiled to bite, but when properly coiled it has a longer range. Three-fourths of its own length is generally considered the maximum distance a snake can strike, although it is claimed by some that they can leap farther than their own length. This is doubtful, unless the snake is coiled on a slope. Incidentally, the tongue is a tactile or sensory organ, and has nothing to do with the poison system.

Venom affects the system in a number of different ways. It contains neurotoxins, which act on the nervous system by breaking down the nerve center cells. Hemorrhagins break down the walls of the lymph and blood vessels, causing swelling and bleeding. There is an anti-bactericidal property which greatly increases the danger of infection. The fibrin, or coagulating element of the blood, is attacked and the blood is prevented from clotting. Some of the other symptoms which frequently accompany snake-bite are sharp burning pains in region of the bite, nausea, weakness, thirst, vomiting, chills, and respiratory difficulty.

The quantity of venom yielded at one time depends on various factors including the size of the snake and the period of fasting and hibernation. Usually about one-half of the supply in the glands is ejected at a thrust, which in the timber rattlesnake averages about 5 minims or 0.3 cc. Snakes are immune to their own poison.

In 1928 a survey was made of the snake-bites which occurred in the United States that year. Cases treated with serum showed a death rate of 3% as compared with 10.8% in cases not treated with anti-venom serum. Of 42 known cases in Pennsylvania, 26 were caused by copperheads, 7 by timber rattlesnakes, and 9 from undetermined poisonous species.

As nature primarily intended the highly specialized poisoning equipment of venomous snakes as a means of their procuring food, one can appreciate the efficaciousness of this provision when observing the effects of their venom on creatures the size of man. It might be interesting to note that in Siam elephants are occasionally killed by king cobras. The mortal bites are inflicted either on the end of the trunk or at the juncture of the nail and the foot, where the skin is tender. The elephant is said to die in about three hours after being bitten.

When walking through the woods, your rubber or leather boots offer ample protection to your legs. If you must do any climbing, place the hands carefully. When there are rocks or logs in your path, step upon them and then down, for if you step over them you may step on a snake. In selecting a camp site choose an open spot away from rocky ledges. Hang up your extra clothes and bedding during the day.

If you have the misfortune to be bitten by a snake, you will fare much better if you do not become excited. First determine if the snake was a poisonous one. If it wasn't, your wound will bother you no more than a scratch. If it was a poisonous species, the following first aid measures should be carried out. Don't run, as it will increase the circulation and distribute the poison more rapidly. Don't drink whiskey, as it also increases the circulation and lowers your powers of resistance. Apply a tourniquet consisting of a shoestring, handkerchief or anything that is immediately available above the bite wherever there is a single bone, as the finger, toe, upper arm or thigh. (If applied below the knee or below the elbow, a tourniquet can not be as efficient because of the veins that lie between the bones.) Apply tight enough to retard the circulation, and every ten or fifteen minutes loosen the tourniquet for about a minute to prevent gangrene. Make an incision with a clean razor or sharp knife about one-third of an inch deep parallel to the long axis of the limb, with a cross cut joining the fang punctures. Apply suction with the mouth if free from cuts, or by mechanical means such as a breast pump. Keep up the suction until symptoms show relief; hours if necessary. Get to a competent physician as quickly as possible. Strong coffee will serve as a stimulant. If you have a supply of serum with you, follow the directions carefully.

****

A PERSISTENT RAINBOW

Kenneth A. Reid, Board member, furnishes the following account of a rainbow trout that carried away two flies, and finally succumbed to the lure of a third artificial of the same pattern, a no. 10 fanwing Royal Coachman.

Fishing on a favorite stream, Mr. Reid, an ardent admirer of the fighting qualities of the rainbow trout, hooked a 15-inch rainbow that succeeded in its first attempt to break away. Later, a second fly was taken by the frenzied rush of the fish to escape.

At a point about ten feet above the scene of his first experience, Mr. Reid's third attempt to land the trout succeeded. The rainbow's fight on this occasion was sluggish. Embedded in its upper jaw were two flies of the pattern in his fly book. It is his belief that the fish, in a vain effort to rid itself of the feathered barbs had threshed about until it became so tired that following the third strike it offered little resistance.

****

STREAM IMPROVEMENT "ACCORDING TO TYPE"

Editor's Note: Gaining momentum with sportsmen in all sections of the state as spring approaches, the stream improvement program advocated by the Fish Commission holds promise as an outstanding factor in the drive for better fishing. Types of dams and deflectors, their relation to the food supply in trout streams, and the importance of making them as permanent as possible have been stressed in former issues of the ANGLER. The following article pertains to streams of different types and most effective methods by which they may be improved.

--

It is an accepted physical fact that a remedy for one individual may prove of little or no value to another. Perhaps, if streams are regarded in the light of individuals, the stream improvement "according to type" plan will be more readily accepted. In brief, since Pennsylvania's trout streams are not identical in type, improvement methods must vary. While the seven stream types given in this article do not, in any sense of the word, cover the entire range of conditions on our trout waters, they may serve as a general chart in improvement work.

In the first group are uniformly shallow streams and streams of uniform depth. Current deflectors answer the needs of a shallow stream and are highly effective if properly installed. These deflectors, (examples - the boulder wing and log wing deflectors described in the February ANGLER) should be constructed with the idea of speeding up the current and restricting the width of the channel. By putting the current to work in this manner, ideal natural pools for trout are formed. In a few instances, log or boulder dams may be constructed on such streams, but care must be exerted not to warm the current to detriment of trout in lower waters. Streams of uniform depth, with sufficient pools may be greatly improved by installing shelters or brush and logs.

Type two streams include those that may become dangerously warm during summer months and streams of very cold temperature (below 60° Fahrenheit) in summer. The second group in this classification is rare. To improve waters that become dangerously warm, install current deflectors, with the idea of deflecting the current to shaded shores. Shade on such waters is of vital importance. It may be increased by planting willows and brush on the shores, weighting down available brush so that it will grow over the water, and by decreasing exposure and introducing additional shade on spring tributaries. Building of dams on waters that become so warm during summer is a dangerous practice. If channels of spring feeders are clogged with muck they should be cleaned out.

Under classification three are streams that are either deficient in small trout or oversupplied with them. In streams having few small trout, deflectors should be installed, with the idea of accelerating the current to expose additional beds of gravel that may serve as spawning areas. All tributaries should be opened to provide additional spawning areas, and log and brush shelters should be introduced as additional cover for young trout. If the stream is overstocked with small trout, do not increase shelter for them. The food supply and more suitable waters for large trout may be supplemented by introduction of current deflectors.

In classification four are streams subject to fluctuation in flow. On such waters, small dams may be effective in forming pools to serve as additional cover and forage areas for trout. Streams choked with sand or muck come under classification five. They may be improved by introducing current deflectors to form a fast, narrow channel. Covers also may be effectively used in improving this type of stream.

Brush and log covers, and current deflectors to increase areas of rich muck on the bottom where insects may breed, are methods for improving type six streams, deficient in food for trout. Streams that come under classification seven are those that are too heavily fished in the most accessible sections. Current deflectors and other shelter for trout may be introduced to the poorer fishing sections on such streams to good advantage.

****

TACKLE SUGGESTIONS

Fishing, in the opinion of Rev. James H. Goss, of Lewistown, has many enjoyable features not definitely related to catching trout, bass, or other game species. He ranks planning and tackle checking in preparation for days astream as an important sidelight to angling, and offers the following tackle suggestions.

Winter is an ideal time for getting equipment in shape from "rod grip to suspender buttons." The check-up should include rod, reel, boots, line, leaders, flies, creel, and creel strap. Make certain that the rod is not warped, and has no loose guides or ferrules. Hang it up full length, or each joint separately. A clothespin, with hook attached, is a suitable attachment for this purpose. At least two weeks is required to put a coat of substantial varnish on a rod. Quick drying varnish or shellac may be detrimental to its action, soon cracking off and admitting moisture to the bare wood. Moisture is the enemy of the split bamboo.

To derive the greatest pleasure at the opening of the trout season, Rev. Goss suggests, have your tackle in A-1 condition, and don't expect a rod maker to work wonders on an old rod in a week's time. It can't be done.

****

GET YOUR FISHING LICENSE EARLY

Pennsylvania's fishermen are discarding the idea of waiting until the opening of trout season for a last minute rush to buy fishing licenses. From the angler's viewpoint, every factor favors early license buying. Open winters in recent years have greatly increased sucker catches, and sucker fishing in consequence has increased by leaps and bounds. There is every reason to believe that the fisherman who gets a license early in the year derives the greatest benefit from it in recreation and catches. The balanced stocking program of the Fish Commission insures increased numbers of suckers, catfish, and other favorites of the fishing public.

The Board of Fish Commissioners is undertaking this year a comprehensive plan to better fishing conditions in all parts of the state. Included in this program are the two new trout raising stations at Huntsdale, Cumberland county, and Forked Springs, near Bellefonte, Centre county. It is hoped that licenses this year will be taken out as soon as possible so that there will be no interruption in the work planned for 1933.

****

HERE AND THERE WITH OUR ANGLERS

Sucker fishermen in the vicinity of Fannettsburg have been making fine catches in Indian Lake, according to word received from Rev. Charles W. Maclay, ardent Franklin county sportsman. Included in the catches was a sucker measuring 19½ inches and weighing two pounds, 12 ounces, by H. J. Shoop. J. A. Shearer, has caught the largest number, while Harry Miller landed a sucker weighing two pounds, 10 ounces.

Warden D. K. Broadbelt, of Pocopson, reports excellent sucker fishing in streams of Chester county. The Octoraro and East and West Brandywine have yielded good creels, particularly at their juncture with tributary streams.

J. F. Livingston, chairman of the membership committee of the Old Town Sportsmen's Association in Clearfield county, reports a steady increase in membership, and informs the ANGLER that the association is keenly interested in bettering fishing in that county.

From Warden Horace P. Boyden, Wellsboro, Tioga county, comes word that many big trout were observed on the spawning beds in Big Slate Run, Lycoming county, last autumn.

AFTER READING PENNSYLVANIA ANGLER, PLEASE PASS IT ON TO FRIENDS WHO LIKE TO FISH.

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PENNSYLVANIA ANGLER

NEWS BULLETIN FOR FISHERMEN

APRIL, 1933

P38.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. Deibler, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. Deibler, *Chairman*, Greensburg
John Hamberger, Erie
T. H. Harter, Bellefonte
M. A. Riley, Ellwood City
Dan R. Schnabel, Johnstown
Leslie W. Seylar, McConnellsburg
Edgar W. Nicholson, Philadelphia
Kenneth A. Reid, Connellsville
H. R. Stackhouse, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

Alex P. Sweigart,
Editor,
Harrisburg.

PENNSYLVANIA ANGLER

April, 1933.

TROUT FISHING AND THE BARBLESS

The fisherman's red letter days are here. Trout fishing, a sport linked with swift cold streams, and the soft green of grass and foliage in early spring, holds a dominant place in the affections of thousands of Pennsylvania's anglers. It calls to the finest instincts of sportsmanship and fair play in those who fish our trout streams. Its future as one of our greatest outdoor sports rests, in major part, with the fishermen.

Opening of the trout season on April 15 invariably is heralded by a rush of anglers to the haunts of brook, brown, and rainbow trout. Streams open to the public, many of them smaller waters in mountain and meadowland, are crowded with sportsmen who have in their keeping the responsibility for good fishing in years to come.

That responsibility must necessarily be assumed by fishermen who look to the future of trout fishing in Pennsylvania, and who want to keep our streams at a production peak. Our anglers should be conservationists, interested not only in heavy catches but improving trout waters and fishing with the idea of sport predominant.

On many of our streams a great number of undersize trout are killed annually. By the next season, these fish, or at least a fair portion of them, would have provided abundant sport for fishermen. If these small fish were returned to the stream alive, nature would be enabled, in a far more efficient manner, to restock waters depleted by heavy catches.

Consideration for undersize trout is the angler's most effective method of assuring good trout fishing for years to come.

I heartily advocate use of the barbless hook in effecting this great saving of undersize fish. A barbed hook, embedded deep in a small trout, may not be extracted without tearing the little fellow beyond hope of survival. To see a four or five inch trout drifting with the current, its last feeble efforts to live tingeing the water with blood, is a miserable sight for the true sportsman. It is pathetic, and often inexcusable as well.

Any hook can be converted into a barbless by bending the barb flat with a sharp-nosed pair of pliers, or snapping it off. Small pliers may be carried in the creel or the pocket.

When a small trout is brought to the surface, it may be released with the same pliers without being taken from the stream. A twitch of the wrist, with the pliers at the base of the hook, is usually sufficient to turn the little fellow loose unhurt.

Our sportsmen this summer will undertake an intensive campaign of stream improvement, according to many reports received at the Fish Commission. Their efforts to improve trout fishing by bettering stream conditions will be made doubly effective if more anglers use the barbless hook. In brief, improved trout waters need trout, and the barbless hook will go far toward supplying that need.

Every true sportsman admires a fighting fish, whether it be trout or bass, pike perch or pickerel. The barbless hook gives these fighting fish a real chance to display their game qualities to the utmost.

From every angle - conservation, fair play, and gameness in fish - the barbless hook is worth while.

Gifford Pinchot

THE FISH COMMISSION

IN PENNSYLVANIA

(Part Four)

by

OLIVER M. DEIBLER,
Commissioner of Fisheries.

LAKE ERIE

A study of psychology of fishes is an essential feature of the fish culturist's work. The education of young bass to feed upon particles of ground food clearly illustrates this fact. Teaching bass to feed in this manner is a difficult task, requiring the utmost in patience on the part of attendants.

During the feeding, it was observed that where certain individuals had a home or hiding place, they would dart from this cover, capture the particle of ground food and return to the protected area. After a careful study of the actions of the fish in taking food, observers were convinced that the bass could be more easily taught to feed if they were provided with a home or protection.

This protection apparently gave them a sense of security and more courage to venture forth and capture food. In consequence, at the present time the shores of the bass nursery ponds are covered with a net of submerged logs and brush for this purpose. This apparently insignificant detail has been a major contributing factor to our success in feeding and holding bass at the hatchery.

Few people realize the task involved in attempting to provide worth while fishing for the many types comprising our half million anglers, taking into consideration their constantly increasing number, and the checks civilization has put upon our fish life. Of these checks, probably the indiscriminate cutting of the timber has been most detrimental. It has caused the waters to become very fluctuating, subject to wide temperature ranges, and has greatly increased their turbidity. These factors as well as being detrimental to reproduction of fish, have been just as detrimental to the production of natural food for baby fish. As a result, from year to year, the Board was compelled to increase constantly the size of fish liberated, and today, many of them are being held at the hatcheries until they have at least passed through their first two feeding stages. The detrimental factors are shown in a more marked degree on our trout streams than on our larger bodies of water. In fact, to such an extent is this true that we look upon natural reproduction of trout as a thing of the past and the holding capacity for small fish so limited that in order to provide fishing, the trout are retained at the hatcheries until they are from six to twelve inches or of a size ready to be caught. But in spite of these handicaps, taking Pennsylvania as a whole, with our present methds of massed production and distribution, we are providing better brook trout fishing than any other state in the Union.

In our stocking program, all fish are stocked by our own personnel, and taken to streams in the Fish Commission's trucks. Interested sportsmen often aid in stocking and we welcome their cooperation at all times in this work. Before the shipment is to go forward, the Hatchery Superintendent notifies sportsmen, who assist in distributing the fish, of the time of arrival of the truck at a designated point.

The Fish Commission has made a careful investigation of most of our waters with reference to their adaptability for certain kinds of fish, forage conditions, and the extent to which they are being fished. In our ponds and lakes, special study has been made in reference to the food competition of various species, care being taken not to introduce a combination where two or more kinds would be in competition for the same source of food supply. The stream survey completed recently has proved of great value in this program.

The Fish Commission is one of the few state agencies that is on a productive basis and in making our annual distribution, a value of the amount that would have to be paid, if purchased from a commercial hatchery, is placed on each fish. In 1932, the income from all sources was $419,438.03 and fish were produced having a value if purchased of $791,170.68.

The Filed Service consists of a group of men especially trained for this type of fish cultural work, which takes in the collection of the eggs, pond and stream surveys and commercial hatchery work. There is scarcely a month in the year when these men are not actively engaged in harvesting the crop of one or more species of fish eggs. With their progress in this work rests much of the success of distribution from the hatcheries, as the annual crop of fish cannot be produced if the hatcheries are not provided with the all important egg supply.

One branch of our fish cultural activities not heretofore mentioned, and coming under the field service, consists of the work carried on at Lake Erie in conjunction with the commercial fishing industry. Pennsylvania has a shore line on Lake Erie of approximately only forty-five miles, yet the fishing industry in this area grew from a few hook and line fishermen, who sold their catches to the early settlers, to an average annual catch of 18,000,000 pounds of fish. As a result the city of Erie is looked upon as the largest fresh water fishing port in the world, and the maintenance of this great industry is only made possible by the work of the various Fish Commissions of the States bordering Lake Erie, and Canada.

Civilization has placed serious checks upon the production of fish in this large body of water as well as on the smaller lakes and streams. The great demand for fish brought about chiefly by the modern methods of storing, packing, transporting and advertising, have led to a vast investment in fishing equipment, including the most modern tackle known for the capture of fish. This area, with the check civilization has put upon the growth and natural reproduction, could not possibly stand the drain put upon it, was it not for fish conservation brought about by artificial propagation and protection. For example, in 1925, there was operating, out of the port of Erie alone, a fleet of seventy-five boats, using daily approximate three hundred miles of nets having an average depth of seventy-two inches.

The worth while catches of fish take place as the fish are moving about in vast schools, seeking likely places for reproduction. They are caught before they are given a chance to deposit their eggs, with a result that in the days before the practice of fish conservation, the unfertile ova were thrown away with the waste portions of the fish when they were dressed for market. This waste has been changed to a gain. During the spawning season of the many species sought, trained spawn takers or field men are placed on each boat. As the catches are lifted and while the fish are yet alive, the eggs and milt is artificially extruded, fertilized and cared for until the boat reaches the port in the evening. The eggs are then transferred to the State Fish Hatchery at Erie, artificially hatched in glass jars of running water on what is known as a hatching battery and after hatching, the baby fish are returned to the Lake. This is a great measure in fish conservation and turns millions of little fish back into the Lake to grow into an investment having a tremendous food value.

The lake and stream survey includes investigations made of our waters in order that an intelligent stocking program can be carried out. The information most sought in these surveys is what kind of fish certain areas are best suited for, growth and reproduction of fish in such waters, and how many should be planted in order to utilize fully the food resources and maintain a dense population consistent with normal growth. Other factors considered are what size fish should be planted to give the desired results and what, if anything, can be done to make the waters more productive. In addition to this, for a number of years the Board has been encouraging land owners to construct ponds where facilities are available, not for the purpose of growing and marketing fish, but chiefly to provide a recreational center for themselves and their friends. In order to assist those interested, representatives, upon request, view the proposed sites for the purpose of advising them how to proceed with the construction and to outline an intelligent fish stocking program.

(To be continued)

THREE AT A TIME

Three calico bass, of exactly the same size, were taken simultaneously by William Troster, Kingston angler, while fishing on the North Branch of the Susuqehanna River, near Meshoppen, last season. The fact that calico bass are rarely caught in this section of the river makes the catch still more unusual, according to Warden Russell J. Womelsdorf, who reported the catch.

Troster was fishing from a boat, using two rods, and two lines, with two hooks attached to each line when he made the catch. The calico bass struck at the same time on minnows that he was using for bait. They were identical in size, each measuring 11 inches.

The Kingston angler also caught a 22-inch salamander on the same day. The waterdog was retained alive, and later presented to the Kingston High School, where it was placed on exhibition.

****

FROM PLANKTON TO BLACK BASS -
THE LIFE CYCLE IN A LAKE

by

C. R. BULLER,
Deputy Commissioner of Fisheries

In every body of water nature has created a wonderful balance of existence, or cycle of life. Every sphere of aquatic plant life, every microscopic insect, and every species of fish in an area of water, have a direct bearing upon one another. In other words, the life and growth of one depends upon the life and growth of the other. As an illustration of the cycle of life in a water community, we will take one of our numerous inland lakes in Pennsylvania. In this lake will be the average growth of aquaric plant life. It will be full of the minute water organisms, snails, mussels, and crayfish. The fish life will consist of the black bass, yellow perch, catfish, sunfish, and shiner, a species of minnow.

The plant life not only absorbs the impurities from the water but in turn throws off oxygen, and makes a spawning place for certain kinds of fishes and for various insects which go through the period of transformation in the water. These in turn furnish food for fish and other animal life. It also makes conditions favorable for growth and reproduction of the micro-organisms.

We will class the minute organisms present in the water in two groups, namely: the net plankton and the dwarf plankton. The net plankton are organisms large enough to be caught in a net made of fine silk bolting cloth, while the dwarf plankton are too small to be caught in this manner. These dwarf plankton are the food of the net plankton. Decomposition of vegetable matter or plant life makes conditions favorable for growth of the dwarf plankton. During the decomposition a mineral substance is thrown off. This in turn is taken up by the dwarf plankton, and helps to develop the limy shell on some of the net plankton. Net plankton, particularly the ones having the limy shell, furnish food for almost all the young fish for the first few weeks of their life.

The mineral in this shell is highly essential to the health and growth of baby black bass in particular. Thus can be seen the bearing that aquatic plant life has on fish life. These plankton are always present in the water but as the temperature reises in the spring of the year and before the baby perch are hatched, will start to reproduce very rapidly. The yellow perch being the first fish to hatch in the spring, and its growth being slow for the first eight weeks, as compared with that of the bass, it will feed chiefly upon the plankton. The next to hatch will be the baby bass. After reaching the stage where they must have some fish life for food, they will prey upon the baby perch. The young of the shiner will next appear. The shiner, intended as food for other fish, is very attractive in appearance, a non-competitor for fish life as food, and very fecund or fruitful. It follows that these little fish will be preyed upon by the baby bass and baby perch. As the bass increases rapidly in size, they will continue to prey upon the perch to a certain extent during the summer months.

The last fishes to spawn in the pond will be the sunfish and catfish. Their chief food will be small snails, mussels and insects clinging to the aquatic plant life. Nature has placed each creature in the water to live upon the other. Each day the life of an individual is given to maintain the life of the species. Capacity for reproduction in a species is in proportion to the demand on it as food for other creatures.

If a strange species of fish is introduced, it will at once destroy this balance. Every aquatic animal perfers certain types of food. The stranger or new kind of fish will prey upon the kind of food it desires, making the native in the pond, whose food requirements may be similar, seek elsewhere for its food. If the stranger introduced be a pike, for instance, the bass will have to seek elsewhere for its food, which perhaps will be the small sunfish and catfish. Decrease in their number would follow naturally.

As the sunfish and catfish feed largely upon bottom insects, their drain upon these animals would not be so great, resulting in an increase in the insect population. Since bottom insects feed largely upon the plankton of both kinds, this would result in a decrease of the plankton. The plankton, above all things, is essential to health and growth of most of the young fish. Therefore, the decrease in plankton caused by increase of the bottom insects which feed upon them, would retard the health and growth of the next season's hatch of baby fish. If the young fish cannot secure sufficient plankton, they will take the next best thing, which is their brother and sister or the young of another kind of fish.

After introduction of a new species of fish in a body of water, no doubt in time a new balance between the supply and demand will be created. But in almost every instance, the number in the pond will not be so great as before.

While the Board of Fish Commissioners is making every effort to maintain good bass fishing in Pennsylvania, it requests the fisherman not to introduce bass into waters where they do not already exist, particularly in small inland lakes. When black bass are introduced into a small inland lake, it is at the sacrifice of the rest of the fish in a small water community.

When the bass is first introduced, on account of the amount and kind of food it requires, it interferes with the natural balance more than any other fish propagated by the Board for distribution. If the history of the black bass is carefully studied, it will be seen that its introduction into the small inland lakes has invariably resulted in a decrease in number of the other species in those waters.

Poor fishing in a body of water can be caused by many things, but the most important are lack of food supply, interference with spawning habits and over-fishing. The simplest remedy in most cases is to restock the body of water, but before doing so, a study should be made of the conditions to determine why fishing in this particular water is on the decline.

Fishermen may occasionally make the remark that fish in certain bodies of water have too much food and will not bite. Fish life, like all other animal life, cannot exist without food. A body of water will support fish life in proportion to the amount of food therein. If a body of water contains an abundance of minnow life as food, the angler should use some other lure to capture the fish. In some instances they may readily strike at the strange bait as they are quick to respond to a change in diet.

Bodies of water barren of aquatic plant life, brush, old stumps, and other cover, usually contain few fish in proportion to their size. This is chiefly owing to a poor food supply. In a body of water of this kind, conditions may be improved by introduction of plant life and minnow life. Plant life in a body of water serves as natural spawning ground for many insects, whose larvae go through the period of transformation in the water and are favorite food for many fishes. It also provides the growth of minute water insects that the baby fish feed upon, and provides a place of concealment for young fish.

Aquatic plant life in a body of water plays such an important part on the fish life, that men are making a business of growing the plants and selling them in the market for introduction into barren waters. If care is taken in planting such vegetation, and the proper varieties secured, it may be induced to grow in almost any body of water.

Again, from unknown causes, the minnow population in a body of water may become scarce. This may not be noticed until the number of the other species begin to decrease. Now this condition will not be bettered very much by stocking the water with more fish, until the minnow life or food supply is increased. This can be done by restocking with minnows. After they have a chance to reproduce and the pond is inoculated with a new food supply, it may be stocked with other fish.

In many instances, small inland lakes and ponds are used as a source of water supply for manufacturing plants in the rural communities. Many of the natural lakes cannot be drained below a certain level, and occasionally artificial dams are constructed at the outlots of the lakes. Consequently, in the spring of the year a new water level is established. Most of the fishes in our inland lakes spawn in spring, and seek shallow water in which to deposit their eggs. In many instances, before the eggs are hatched or young fish are old enough to leave the nest, the water level is lowered with a result that thousands of eggs and young fish are left on the shores to die. This also means the death of eggs and young of the water insects that spawn in a shallow depth of water. These conditions are hard to overcome, but in any body of water, where a constant level can be maintained, conditions will be more favorable for the reproduction of aquatic life.

****

"OLD JONAH"

Two unusual factors combine to make the life of "Old Jonah," the big lake trout retained at the Fish Commission's hatchery at Corry, unusual. He was forty years old when he died, and he was placed on exhibition at the World Fair in St. Louis, Mo.

When Corry hatchery, in Erie county, was purchased from Seth Weeks in 1882, "Old Jonah" was being retained at the ponds. A male trout, with a pronounced undershot jaw, he attracted a great deal of attention when visitors came to the hatchery. At the time of the World Fair, the trout was 35 inches long, and because of his extreme age, he was one of the fish returned to the hatchery.

Time brought strange changes to the appearance of "Old Jonah." When he died, he was only 15 inches long, and had lost weight. His skin was black in color and wrinkled, and he was totally blind. A badly deformed spinal column and head and jaw that had not diminished in size as did the rest of his body, made his appearance grotesque.

Naturally, he created a lasting impression on people who saw him, and today visitors at Corry occasionally ask concerning "Old Jonah."

****

THE RAINBOW TROUT
(Salmo Irideus)

by

KENNETH A. REID,
Member, Board of Fish Commissioners

The rainbow trout is native only to the waters of western America from the crest of the Sierras and Cascades ranges to the Pacific Ocean. There are several different species of the parent form, Salmo Irideus, including the golden trout in the vicinity of Mount Whitney and southern California, and the McCloud River rainbow, Salmo Shasta - the rainbow of the fish culturists, and the one that has been stocked widely, not only in the United States but in many foreign countries in both hemispheres. Notably in New Zealand these introduced rainbows have attained an average size considerably greater than their parents in the native habitat. The largest rainbow reported on rod and line in the United States was 22½ pounds. While this is, of course, exceptional, fish of from 2 to 6 pounds are not at all uncommon in many of the waters of the Pacific states and many of the rivers of the Rocky Mountain region where they have been introduced.

In Pennsylvania, the rainbow caught by John Bicton from Lick Run, Clearfield County, as reported in the PENNSYLVANIA ANGLER, January 1932, was likely a record. This fish was 27 inches long and weighed 8¾ pounds. It was a perfect specimen and was caught on a cricket.

The far famed steelhead trout is, according to the late Dr. David Starr Jordan, merely a sea-run rainbow which spends part of its time in the Pacific and ascends coastwise streams from Cape Mendocino northward for the purpose of spawning. Unlike the Pacific salmon, the steelhead does not die after spawning. In this respect, as in fact in many others, he has many points in common with the Atlantic salmon, Salmo Salar.

The rainbow trout is a black spotted species in which the characteristic marking is a rainbow stripe along the lateral line. In immature fish, which would normally include those up to 10 or 11 inches in length, this rainbow stripe is not present. The markings on the small rainbow are dark vertical parr markings along the sides with delicate pink shading between. Likewise, the immature fish have a marked fork in their tails and a comparatively blunt and rounded nose and prominent eyes quite unlike the mature specimens with their well shaped bodies and almost square tails.

The rainbow is a lover of fast water. He prefers streams of good size where the current is heavy and the bed of the stream obstructed by boulders which alternately form rapids and deep pools. Where he is found in streams that also contain brook trout and brown trout, the larger rainbow will frequent the swiftest currents, provided they have sufficient depth. They do not, ordinarily, show good results when planted in small streams or those where the current is slow or the beds wide and shallow. Occasionally where slow streams flow into a lake or reservoir, the rainbow will thrive by spending a part of the year, usually during the winter, in the lake. They are more migratory than either the brook trout or the brown trout and unless big water that is unpolluted is available to them, the results from stocking are apt to be disappointing.

Unlike the brook trout and the brown trout, the rainbow spawns in the early spring and streams in which they predominate should not be fished in April.

As a game fish, the rainbow is second to none of the trout found in Pennsylvania. He rises well to the artificial fly, both wet and dry, and after the hook is set, he frequently leaps repeatedly high above the water and has remarkable endurance. One habit that is very disconcerting to the fisherman is his frequent custom of turning at the end of a long run and making a bee-line for the feet of the angler with such speed that it is next to impossible to recover the line fast enough to avoid slack.

While the rainbow trout is second to none as a game fish amongst the fresh water species, his application to Pennsylvania streams is not as wide as that of the brown trout. His nomadic habits make the results from plantings very much of a gamble, and quite often those stocked in a certain stream may later turn up in another stream miles away, necessitating the fish traveling through some of our larger bass waters to reach the second stream. For instance, occasionally a large rainbow is caught in the Allegheny River and it seems almost certain that at times they migrate through this river.

Due to his rather limited application to Pennsylvania streams, the Board of Fish Commissioners does not propagate the rainbow trout. Quite a few are planted in Pennsylvania streams each year by sportsmen who procure them from the United States Bureau of Fisheries, and, in a few streams they have held forth year after year and furnished good fishing.

****

WATERSNAKES ACTIVE

Anglers who invade the trout streams early this season will have an opportunity to benefit trout fishing by killing watersnakes, judging by recent reports that these reptiles have emerged from hibernation.

J. Herbert Walker, of Montgomery, vice-president of the Lycoming County Sportsmen's Association, recently killed a watersnake measuring three feet six inches. Examination of the snake revealed that it had swallowed four trout, one of eight inches, the others about five inches in length on an average.

While patroling Liberty Valley Run, in Perry County, Warden C. V. Long, of East Waterford, reports that he killed one of these enemies to fish life a short time ago, as the snake was swallowing a trout.

By way of reminder - dead watersnakes mean more fish for the fishermen.

****

TROUT COVER A KEYNOTE IN STREAM IMPROVEMENT

The ideal trout stream combines three vital factors - food abundance, proper water temperature, and good shelter. Lacking in any one of these essentials, the capacity of a stream to produce trout of maximum number and size is necessarily limited. A brief consideration of these factors shows their relationship to stream improvement.

Food abundance is governed by various factors. Classified as trout food are many forms of aquatic and insect life. The crayfish and cold water species of minnows constitute an important feature in the diet of larger trout. But growing trout, fingerlings, require much more food, tiny forms of aquatic organisms that cling to growth on the stream bed, to brush and rocks. Included in this group is the larvae of insects that have developed in the water; for example, the larvae of the caddis fly. From brush and growth on the shorelines comes another important class of trout food - insects that may drop into the water. Earthworms washed into a stream from the banks also provide forage. Forage and shelter, it is to be observed in this checkup, hinge upon each other.

The water temperature of a trout stream should be low, that is, having a summer temperature range not over 70° or 72° in midsummer. In former issues of the ANGLER, the temperature factor was stressed in improvement work. Governing the temperature range are small spring tributaries and the speed of the current. Deflectors in slower streams serve an admirable purpose by accelerating the current and forcing it to create pools adaptable to trout, while the spring feeders may be easily cleared of muck and brush in a manner that will assure a constant supply of low temperature water. Here again shelter plays its part, for the spring feeders, in as many instances as possible, should have abundant shade as an aid to low water temperature.

In providing additional trout cover on a stream, the first consideration should be introduction of it at points where it will serve a dual purpose of protection and the creation of additional growth for food. Certain areas of a stream may be without growth of trees and brush on the shores. Planting of willow slips at these locations, and the introduction of additional brush may aid in reclaiming such waters.

The stream bed itself offers an ideal opportunity for introduction of additional shelter. Fallen trees with their branches intact may be placed counter to the current, and firmly staked in place. Drift carried by the current lodges against these branches and forms additional shelter. In line with this increase of cover in the stream itself is the introduction of loosely woven bundles of brush, anchored securely near shore. Brush bundles furnish a breeding place for aquatic organisms and a hiding place for young trout from their natural enemies.

Logs properly placed in shallows and pools provide good cover for trout. Another idea that has gained headway in improvement of this type is the weighting down of small trees and bushes on the shoreline in such a manner that they will project over the water. The advantages of this system may readily be seen. Overhanging foliage provides a resting place for insects and assures additional shade. Heavy rocks will serve as anchors in this type of improvement.

On any trout stream, the presence of areas too dense to fish is of definite advantage. These areas, with their dense brush and tangles of logs and other cover in the water serve as natural feeders to heavily fished portions of the stream. Trout lurking in inaccessible pools aid in natural restocking at spawning

time and dropping down into accessible areas provide additional sport. Densely covered areas also aid in keeping the water temperature at low level, and serve as breeding grounds for much natural forage.

For better trout fishing, consider this vital factor of shelter on our trout streams.

****

A FATAL "RESCUE"

Casting should be limited to game fish, and certainly woodchucks should be excluded from the picture, according to H. P. Shawkey, of Warren.

Shawkey was casting for bass on the Allegheny River last season. While retrieving his cast, he saw a baby ground hog swimming the stream, and thought that a helping hand might save the little fellow from drowning. Accordingly, the next cast landed squarely in front of the amateur swimmer.

In an incredibly short time, the woodchuck became so entangled in hook and line that it was drowned before Shawkey could release it.

****

STREAM IMPROVEMENT WORK BRINGS RESULTS

Favorable results from improvement projects on Tioga county trout waters have been reported to the Fish Commission by Warden Horace P. Boyden, of Wellsboro. While streams in that territory were at low water levels last season, deflectors and dams were constructed.

On Long Run, a large meadow stream, the deflectors, logs fastened in the banks at the base and extending quartering downstream, were particularly effective. In checking on results, Boyden found that these deflectors had formed fine natural pools and cover through the digging action of the increased current.

Another method that produced good results, he reported, was the weighting down of willow clumps on the shores and fastening them at the tips with heavy rocks. The natural dam formed by these clumps created a double pool below, while good shelter was formed, through action of the deflected current, beneath the stream bank.

****

BUILD 170 DAMS

Members of the North Western Berks Rod and Gun Club of Bethel are ardent advocates of stream improvement, according to Special Warden Howard Ebling, who is secretary of the club. Last summer the Berks county club members decided that a favorite trout stream in their section, the North Kill creek, should be improved. During the summer, 170 miniature dams were built. These dams provided excellent cover for eighty cans of trout released in the stream later by the Fish Commission. After aiding in distributing the fish, the North Western members assisted in patroling the North Kill to assure good trout fishing this season.

****

THE TIMBER RATTLESNAKE

Editor's Note: Paul L. Swanson, of Polk, has written the following article on the timber rattler for the ANGLER. A knowledge of the habits of this reptile is important for trout fishermen who invade the mountain streams in May and June.

The Timber or Banded Rattlesnake (Crotalus Horridus) is the common rattlesnake of the eastern states. It is sometimes erroneously called the Diamondback. There are two species of Diamondbacks, but neither is found in Pennsylvania. One is found in the southeastern states, and is frequently termed the Eastern or Florida Diamondback to distinguish it from the other slightly smaller Western or Texas Diamondback, which is found farther west, although neither is confined to the state from which it derives it's name. The former is the largest and most dangerous poisonous snake in North America. Specimens sometimes reach a length of eight feet or more, and six foot examples are not uncommon. Besides the aforementioned snakes, there are more than twenty other species and subspecies of rattlesnakes in the United States. One other is found in Pennsylvania; the Massasauga. It is found only west of the Allegheny River and is readily distinguished from the Timber Rattlesnake by it's smaller size, it's different coloration and the fact that it's head is covered by plates (as is the Copperhead's) instead of small scales.

The Timber Rattler ranges from the central New England states to Georgia, and westward to the Great Plains. It is probably more plentiful in Pennsylvania than in any other state. It has been definitely recorded from 36 counties, where it is usually found in the mountainous and timbered regions.

The typical color is yellow or tan, with wavy cross bands of dark brown or black, and a black tail. However the color varies considerably, some specimens being almost entirely black. The cross bands are usually bordered with a lighter color, and are sometimes broken so as to form rather rhomb-like markings. The darker specimens are generally males, though not always, and bright yellow examples are practically always females. In pennsylvania the average specimen seems to be about three feet in length, although much larger specimens may be found. Dr. Raymond L. Ditmars of the New York Zoological Society measured a timber rattlesnake which was six feet two inches in length and almost three inches in diameter, which seems to be the record size.

The rattle is made up of hollow segments of horny skin, thru which the terminal bones of the tail form a hard rod. A rapid vibration of the tail with this appendage produces the rattling. It is interesting to note that many other snakes including the copperhead and various harmless species, sometimes vibrate their tails when excited. If in dry leaves it makes a sound not unlike that of a rattler. Rattlesnakes are born with a "button" at the end of the tail and the segments grow out from the base; usually a new segment is uncovered at each shedding of the skin. The skin is shed on the average of three times a year, so an estimate of the snake's age may be made by figuring three rattles per year, providing the terminal button is still present. The button and the end segments are usually lost before the rattle reaches any great length. It is the size of the snake rather than the number of rattles that is important, as large snakes secrete more venom, and the venom of old specimens is not more toxic than that of the younger.

Rattlesnakes mate soon after emerging from hibernation in the spring, which is generally in May. About September from six to fifteen young are born alive. This is a small number of young when compared with some of our harmless species which may have fifty or more. The babies are immediately able to shift for themselves, and the mother does not make it a point to stay with them.

Many people claim to have seen snakes swallow their young for protection. This seems to be a physical impossibility, as the young would have to find refuge in the regular alimentary tract, and the presence of the digestive jucies might kill them. No one who has spent a lot of time studying snakes and their habits has ever witnessed such a procedure. The fangs of the newborn snakes, which remain soft until birth or shortly after, soon harden and the snake is capable of ejecting small amounts of veno

Timber rattlesnakes are fond of rocky situations. In hot summer weather they avoid the bright sunshine and are apt to be found on the shady side of rocks. During the dry weather they migrate from the ridges and hills to the fields and meadows of the valleys where water is more readily obtainable. As the elliptical eye pupils indicate, rattlesnakes aften prowl around after dark. They do not like real hot weather; neither are they fond of the cool weather of early spring and late fall. Most snakes seem to enjoy being out in a warm summer rain.

In the fall they seek out their den, each individual apparently returning to the same den each year. There they hibernate until spring. A snake den is usually located on a rocky ledge where the many crevices offer opportunity for the reptiles to find shelter below the frost line. A den might occupy a considerable amount of space, and is not to be thought of as merely a cave. Considerable numbers of snkes occupy the same den. Hundreds have been killed within a few days time at some dens in Pennsylvania.

The food of the rattlesnake may consist of almost any mammal or bird that is small enough for it to eat. They rarely, if ever, eat cold-blooded prey. They have been known to eat various kinds of mice, shrews, rats, squirrels and young rabbits. Birds are acceptable if they can be caught. The timber rattlesnake almost invariably strikes his victim and allows it to die before starting to engulf it. Strong digestive juices dissolve almost all of the prey except the fur, including the bones. Young rattlers eat flies and insects, but older specimens seem to insist on warmblooded animals. Economically the rattlesnake is beneficial, as over 50% of its food consists of rats and mice.

The popular story of succeeding generations of men meeting death by means of a fang that has remained in a boot makes an entertaining tale if one is gullible enough to believe it. The liquid content of snake venom dries out quickly, and the very minute particles of crystallized venom which would remain in the hollow of the fang would be too small a quantity to cause serious injury to a human, even supposing that these dried particles could find their way to the blood stream.

A rattlesnake does not always rattle before striking. The sounding of the rattle is not so much a sign of warning as it is an indication that the snake is in a disturbed or nervous mood. Many theories have been advanced as to the real purpose of the rattle. The one most likely is that it imitates the sound made by certain grasshoppers and attracts insect eating birds. Before the country was settled, rats and mice were probably much less numerous than at present, and consequently more difficult for the rattler to procure, so birds might have made up a larger part of his diet than they do now.

The supposition that rattlesnakes will not cross a hair rope or a line made of briars is false, and can easily be disproved by placing one in a circle so made.

The fear of snakes is not instinctive in my estimation. At every opportunity I show captive snakes to youngsters, and those who have never before seen a snake are not the least bit afraid of them.

****

THE BULLHEAD CATFISH

An old cane pole and a can of worms, water muddy and the shore to match; place in this scene a barefoot boy and you have a typical picture of fishing for the bullhead catfish. There is charm in bullhead fishing that has a strong appeal to thousands of Pennsylvania's fishermen. It typifies old fashioned sport with rod and line. The bullhead bites readily and makes no distinction between crude and fancy tackle.

There is about the blundering, home-loving bullhead a quality that may be termed "personality." Certainly it has little claim to the flashing grace and beauty in coloration of the brook trout, or the pugnacious characteristics of the bass. Ungainly in appearance, head broad and body tapering rather abruptly from gills to tail, this catfish blends in coloration with the mud bottom on which it lives.

Raising bullheads is an important feature in the propagation program of the Fish Commission. Four of the Commission's hatcheries - Pleasant Mount, Union City, Torresdale, and Tionesta, raise bullheads for distribution. Stocking takes place in the autumn, when most of the fish are from three to four inches in length. At this stage of growth, the young have attained sufficient size to forage for themselves, and consequently, when they are distributed in suitable waters, there is little attendant loss.

Raising bullheads has involved careful study of the species at the hatcheries. Of foremost consequence was the matter of diet. In its natural environment, the bullhead is classed as a bottom-feeder, generally taking its food at night or when the water is murky from recent rains. To replace this natural diet of small aquatic life, insects, and worms, a ration containing cereals, meat, and milk was substituted. Nature intended that the catfish take its food from a source that would otherwise go to waste in many of Pennsylvania's streams and lakes. In some instances at the hatcheries, they have been known to relish live bait, eagerly devouring minnows tossed into their ponds, but these occasions are exceptions to the rule.

Ponds devoted to the culture of bullheads at the hatcheries vary from 8 x 20 feet to an acre in extent. Brood fish retained in those ponds are permitted to spawn naturally, caring for the young in their own way. When the fry are about ready to follow their individual existence, they are removed from the brood ponds by hatchery attendants. Bullheads at spawning time seek a small cavity in the clay to deposit their eggs. For this reason, hatchery ponds are provided with excavations to be used by the adult fish in spawning.

The parental instinct of this frequenter of the inland waters is one of steadfast loyalty and unswerving devotion. Slow in instinct and almost devoid of cunning, the bullheads may be under other circumstances, but in June, spawning time, the parental urge transforms them. They are then more than a match for bass or pickerel, carp or eel that may venture near. "A bloodthirsty and bullying set," they have been termed at this period, "with ever a lance at hand, ready to battle with an intruder at a minute's notice."

Prior to spawning, the male bullhead does the courting, and after mating has taken place, male and female move along the shoreline, seeking a suitable location for the nest. Sometimes an abandoned muskrat hole or other excavation is opportunely found. But frequently the nest building is an arduous task, a task requiring all the patience of the home-makers. They must dig a hole

in the clay bottom, possibly six inches in diameter, twelve to twenty-four inches in depth. The sharp spines of their fins now serve the purpose of shovels, as they toil at the excavation for five or six days. Occasionally these spines are injured in the operation, resulting ultimately in death. Light sediment is washed from the excavation by fin and tail motion, while the heavier material is taken from the cavity by mouth. So arduously do they labor during this period that the water is constantly murky in the immediate vicinity of the home-to-be.

Following completion of the excavation, the eggs are deposited in a jelly-like ball, averaging about three and one-half inches when fully expanded. The eggs, numbering from fifteen hundred to two thousand, are of rich amber color.

"Just why the bullhead in the inland waters goes to all the trouble to prepare the hole in the earth for a home for eggs and young fish, I am unable to say," Deputy Commissioner C. R. Buller said recently, "unless it is for added protection.

"And again it may be from instinct. Many of the common bullheads inhabit the tidal waters of the Delaware River. At spawning time they seek low marshy swamps on which to build the nest or hole. As the tide recedes, leaving the marshes dry, the parent fish, or the young, as the case may be, enter the hole when the tide goes out. The hole contains sufficient water for their needs until the tide comes in again. After the spawning season, the hole is abandoned, and the fish more or less follow the rise and fall of the tide. This instinct for protection from the receding tide may remain in the catfish of the inland waters."

The driving energy of the male subsides with completion of the nest, and both parents now assist in caring for the eggs and the baby fish. They hover constantly over the cavity, aerating the water by a constant motion of the fins. It is necessary that the position of the ball of eggs be changed from time to time. This is accomplished by rolling it about with their snouts. Should sediment settle on the eggs, an adult takes the ball into its mouth, blowing it out again. In this way the eggs are given a new position on top of the sediment.

The catfish fry, when they emerge from the shell, are tiny helpless creatures, pale salmon in color. During the next five to ten days, the young subsist on a yolk sac attached to the lower part of the body. The home now serves as a nursery, and the parents will not permit the fry to leave it during this period. With absorption of the food sac, the young fish take on a darker color. On their first excursion from the "nursery," the adult catfish hover watchfully about them, stirring the mud to conceal them at approach of an enemy. At first, the young feed on minute organisms, gradually taking heavier food. As they gain confidence, they attempt short excursions from their parents. In three weeks from the time they leave the excavation, they have doubled in size, requiring a great deal more food than their parents can find for a school of such proportions. It is at this stage that they break away in small groups to forage for themselves.

Hardy, adapting itself readily to water conditions in stream and lake, the bullhead occupies an important niche in Pennsylvania's fishing.

****

A RATTLER EPISODE

The deadly effects of a rattlesnake's bite is clearly illustrated in the following communication from Dr. B. D. Hetrick, County Secretary of the Butler County Sportsmen's Association.

"Oneida Dam, in Butler county," he writes, "furnishes excellent fishing for large mouth bass, perch, and blue gills. The banks of this water are kept in excellent order and are mowed back for a distance of at least 50 to 100 feet. During the mowing of the south bank in the summer of 1932, a team of mules were used. At the noon hour, the mules were permitted to graze at will. One, grazing near a stump, was seen to suddenly throw its head up and rear back as if hurt or startled. Investigation showed that it had been struck in the fleshy part of the upper lip by what proved to be a rattlesnake of the Massasauga variety.

"In spite of the services of a veterinarian the mule passed on and those who saw it say that its head was nearly as broad as it was long at the time of its death."

****

HERE AND THERE WITH OUR ANGLERS

A salamander, or waterdog, caught at Pomeroy's Dam on Tuscarora Creek, was found to contain three fish averaging about four inches in length, according to Warden C. V. Long.

Excellent catches of suckers have been made recently in the Frankstown Branch of the Juniata River, according to Warden Lincoln Lender, of Bellwood. Landis Robinson, of Canoe Creek, caught 25 at the juncture of Canoe Creek and the Frankstown Branch on March 30. On that date, a total of 87 suckers were landed where Robinson made his catch.

Gold and the gold standard have been topics of so much discussion recently, that the following correction to a recent article in the ANGLER has a modern tinge. H. P. Shawkey, of Warren, while fly fishing for trout pulled in an object that proved to be a clip attached to a coin. The coin, however, was not a silver fifty-cent piece but a gold dollar.

Nine Mile Run, Pine Creek above Galeton, Potter county, Brooklyn Branch of Pine Creek, Phoenix Run, Cedar Run, and Upper Kettle Creek are listed by Warden Horace Boyden as probable heavy producers of early season trout catches in the Tioga-Potter district this year.

******

AFTER READING PENNSYLVANIA ANGLER, PLEASE PASS IT ON TO FRIENDS WHO LIKE TO FISH.

****

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PENNSYLVANIA ANGLER

PROPERTY OF [illegible]
[illegible]

NEWS BULLETIN FOR FISHERMEN

MAY, 1933

P3 8.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. DEIBLER, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. DEIBLER, *Chairman*, Greensburg
JOHN HAMBERGER, Erie
T. H. HARTER, Bellefonte
M. A. RILEY, Ellwood City
DAN R. SCHNABEL, Johnstown
LESLIE W. SEYLAR, McConnellsburg
EDGAR W. NICHOLSON, Philadelphia
KENNETH A. REID, Connellsville
H. R. STACKHOUSE, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

ALEX P. SWEIGART,
Editor,
Harrisburg.

PENNSYLVANIA ANGLER

May, 1933

PREVENT DESECRATION OF OUR STATE STREAMS; THEY ARE NOT JUNKYARDS

by

OLIVER M. DEIBLER,
Commissioner of Fisheries.

With failure of the legislature to enact laws adequately governing desecration of our streams, this issue is placed squarely before the people of Pennsylvania. Eighty-five per cent. of the streams of Pennsylvania are subject to defilement in varying degrees. The other fifteen per cent., waters free from contamination, must necessarily bear the brunt of fishing by nearly half a million fishermen. Facts must be faced if our anglers hope to keep these splendid streams at a production peak, that is, at a stage where they will furnish a maximum of good fishing and other recreation for each mile of undefiled water. Only through cooperation of the public, the fishermen, and the Fish Commission may this be accomplished.

We must literally "begin at home" in our drive against stream desecration. The day has passed when trout streams, warm water lakes, creeks, and rivers can be regarded as junkyards for worn-out commodities. This type of disfigurement of our waters may be averted only when the people of Pennsylvania unite in a determined effort to bring it to an end.

Let us take as an example one of our trout streams, heading in a mountain gap and flowing through woodland and meadowland to its point of juncture with some larger stream. Its source of water supply lies in deep-seated springs, many of them shaded by laurel and bubbling from the bases of rocky cliffs in the mountain country. Low temperature water, pure as nature intends it to be, it swirls into deep, rock-lined pools, cuts beneath overhanging banks of thick brush, tumbles over falls. There is in its swift noisy descent to the meadows something of the primitive beauty that was Pennsylvania's when the red man hunted along its course.

When it swirls from the woodland, however, a gradual change, a contrast, is to be observed. Here and there on the stream bed may be seen an old tin can. Farther downstream, more evidence of its use as a graveyard for undesirable commodities piles up. A wagon wheel may be resting on a riffle. Old automobile tires, broken dishes, and not infrequently the rusted, battered body of an ancient automobile may impede its course. Evidence is to be found at many spots along this beautiful stream of the careless dumping of useless articles. They mar its beauty, they stamp it as a resting place for the cast-off things of human life. This type of defilement is clearly without excuse, and aroused public opinion in Pennsylvania should dictate its end.

Hundreds of our trout fishermen each year seek waters many miles from the beaten path. A hard tramp through the brush, over steep ridges and mountains, holds nothing to daunt them. Why, you may ask, do they do this when well stocked streams may be more readily accessible? Primarily, of course, it is to find a stream where few others fish. And here again, is proof that there is still the instinct of

our ancestors coursing through our veins - an instinct that caused the frontiersmen to push beyond the barrier of the Alleghenies. These fishermen want something that is easily within the reach of everyone - trout streams unmarked by human carelessness.

Our most accessible streams, trout and warm water, may be given the untrammeled touch of a mountain brook. Public opinion should dictate the policy "Break Up Stream Defilement." This must be the first stride in the anti-pollution drive.

Here is a worthwhile cause for the people to champion, a cause in which they may take an active part. It may well be advocated by teachers in our public schools, by scoutmasters to their troops, by organized groups for social and business betterment, for instance, our chambers of commerce.

Our streams are recreational havens for thousands of the people of Pennsylvania. Obviously, it is to their interest that these waters be as nature intended them - free from the refuse that rightfully belongs on junkheaps or in disposal plants.

****

HICKORY-POLE TROUT

Dawn on April 15, opening day of the trout season, found Shelly Yohn, 6, of Honey Grove, Juniata county, making his way to a pool on Liberty Valley Run. If preparations mean anything in catching trout, Shelly was due to score. Weeks before he had cautiously made his way up the stream, and, in a certain pool, "his pool" had located a number of speckled beauties. Then, just the day before, he had gone into the woods and cut a hickory pole. This pole, a two-cent line, hooks, sinker, and a can of worms comprised his outfit.

Approaching "his pool," however, the little fisherman experienced a sinking sensation. He had missed breakfast to be there in time, but three grown-up anglers, with "fancy tackle" were already whipping the stream. Disconsolately, Shelly sat down on the bank, and didn't even start to fish. Every cast by the other anglers brought suspense to him, but "his trout" stayed by the cause. Apparently they were waiting for bait presented by a hickory pole. Finally, with not a fish to reward their efforts, they passed on upstream.

Then Shelly started to fish. The hickory pole worked its charm, and the trout obligingly began to hit. In a short time, Shelly had three nice fish, the largest measuring ten inches in length. Warden C. V. Long reports that he was one of the happiest boys in the state as he proudly carried home his brook trout catch

****

CANNIBAL BROOKIE

A fine 14-inch brook trout was caught by C. D. Campbell of Media, R.D. 2, while he was fishing Lyman Run in Potter county. Observing a bulge in the fish, Campbell proceeded to perform an autopsy on it.

When opened, he found that the big brook trout contained an eight-inch brookie that apparently had been swallowed only a short time before.

****

THE SUNFISH

by

C. R. BULLER,
Deputy Commissioner of Fisheries.

"Slowly upward, wavering, gleaming
Rose the Ugudwash, the Sunfish;
Seized the line of Hiawatha,
Swung with all his weight upon it.

. . . .

"But when Hiawatha saw him
Slowly rising through the water,
Lifting up his disc refulgent,
Loud he shouted in derision
'Esa! Esa! shame upon you,
You are Ugudwash, the Sunfish;
You are not the fish I wanted;
You are not the King of Fishes.'"

Longfellow

As a rule this poem and the sunfish are equally well known and appreciated by the boy angler, for in nine cases out of ten the first fish to dangle from the hook and line of the small fisherman will be the sunny. The electric thrill of that first struggle with the gamey sunfish without doubt, in many instances, opens to childhood the door to the great wonderworld of fish and fishing. It might be said that this fish, like the egg rolling rights on the White House lawn every May-day, belongs to the little citizens.

What angler, casting for the lordly bass or pike, equipped with all the modern paraphernalia for its capture, has not seen the little barefoot urchins, perched on a log, or as far out on the edge of the marsh as it is possible for them to get, busily throwing in and baiting the hook with worms, carried in old tomato cans? Their tackle usually consists of black thread, "hooked" from mother's sewing basket, perhaps a bent pin for a hook, and any kind of a stick that they can lay their hands on for a pole. If you chance to ask them what they are fishing for, they will look at you in wonderment for asking such a question and answer, "Sunnies, of course." And the sight of these busy little fishermen will always bring back fond recollections of boyhood days.

The sunfish is one of the gamest of all fresh water fishes for its size, and as a pan fish ranks very high. While it might be called the boy's fish because of its gameness, it is commonly fished for by the grown angler. The tackle used in its capture is usually a light rod, hook and line. Sunfish are ravenous feeders and are ever in search of food to their liking. Consequently they are caught in almost any depth of water. They will bite on almost any kind of bait. The angleworm is probably the best for still fishing or trolling, but the grasshopper, white grub, small mussels, and small pieces of fish are also good. They will rise occasionally to the artificial fly. Sunfish travel about in groups or small schools and where one is captured, by a little patience, the angler many times may succeed in capturing the entire school.

The sunfish is well named as it certainly seems to appreciate the sun. On warm sunshiny days they collect in schools in quiet waters along the shoreline, swimming very near the surface, oftimes with their dorsal fins appearing like miniature sails above the water line. If caution is used, one can approach very near the school, but when once discovered, as if from a given signal, a slight splash is heard and the entire group disappear, seeking the protection of deeper water. If undisturbed they will return in a short time to their place in the sun.

The food of the sunfish in their natural home is chiefly small forms of animal life present in the water. The larvae of various insects, some plant life and occasionally a small fish which may be a small individual of their own kind also provide forage.

Sunfish spawn in late spring or early summer, the spawning season extending over a period of from two to three months. By this it is not to be understood that the egg laying period of a single fish extends over this long a period, as when the nest is prepared, the actual egg laying period probably will not exceed a few hours.

In many of the sunfish, sexual maturity is reached at the age of about two years. The long extended egg laying period is no doubt due to early or late hatching of individuals. For instance, if a sunfish was hatched in August and attained sexual maturity at the age of two years, it would reproduce during the month of August. If another individual was born in May, it, no doubt, when at the proper age would spawn during that month.

The male fish prepare the nest, which consists of a place in the shoal waters along the shoreline, oftimes in from five to six inches of water. When the fish decide upon the location of the nest, the small stones are loosened with the snout and by a body and fin motion, all lighter sand and sediment is removed for a space varying from twelve inches to several feet in diameter. When complete, the nest will be a more or less circular place on the bottom, with only the large stones remaining. The female then enters the home, deposits the eggs, and leaves them and the young fish entirely to the care of the male parent.

(To be continued)

GIANT BROWN TROUT HOOKED, BREAKS AWAY

John Sigler, forest ranger, of East Waterford, has the distinction of being the first angler this season to hook the monarch trout of Horse Valley Creek, in Perry county, according to Warden C. V. Long, East Waterford. And take it from John, that trout will give any fisherman a tussle he'll not forget.

Approaching the monarch's hide-out carefully, Sigler had little difficulty in hooking the old-timer. After that it was just too bad for Sigler's tackle. The giant brown trout, estimated at well over two feet, plunged beneath the bank of the deep pool, and despite cautious playing, snapped the line.

****

FOR BETTER FISHING -
KILL THE WATERSNAKE

by

EDGAR J. NICHOLSON,
Member, Board of Fish Commissioners

Streams and lakes of Pennsylvania, when the tribes of red men hold sway, teemed with fish. The major limiting factor to their production was that imposed by nature, in the form of natural enemies. This balance of nature, when our waters were in a virginal state, was so nicely adjusted that the depredations of natural predators did not seriously deplete the supply of fish. Inroads of blue and green herons, kingfishers, ospreys, raccoons, mink, otter, and watersnakes were, of course, heavy, but so vast was the supply of aquatic life that natural reproduction of species of fishes overlapped the incursions of predators. The red man, adept at fishing, may be truly said to have been a conservationist at heart. Necessity demanded that his food should come primarily from fish and game, and his kills were regulated accordingly.

Pennsylvania today, it may readily be seen, offers a vivid contrast, from the angle of the fish supply, to the wilderness of three hundred years ago. A vast army of fishermen have replaced the solitary red man with his crude spear and bone hook. Virgin forests, nature's reservoirs, passed with the great log drives that came with the spring freshets of a half century ago. Pollution of thousands of miles of waterways followed industrialization of the Commonwealth, and rapid growth in population. Obviously, with the limits imposed on fish life under present day conditions, natural enemies to fish constitute a menace that may not be overlooked.

Of these enemies, the watersnake holds first rank. It is more abundant on our streams than other predators, voracious in appetite, and effective in its killing methods. A large watersnake killed several weeks ago was found to contain four trout when opened. Many reports of fish killing by watersnakes have been received at the Fish Commission, and certainly the record of this reptile has no merit.

In making a kill, this squat, drab snake frequently lies on the stream bed, its coloration serving adequately as a camouflage. A fish, swimming over it, is struck sometimes in the tail fin, the anal fin, or a pectoral fin. Following the strike, the watersnake clings to its intended victim as the fish darts frantically through the water in an attempt to break away. Tiring, it is dragged to shore by the reptile. If the fish is large, the watersnake frequently takes advantage of a rock or other projection near the shoreline, securing a hold on the object with its tail, and drawing its prey from the water. It varies its diet, and often catches bullfrogs along the shoreline. So elastic are its jaws that fish of large size may be swallowed.

Sportsmen of Pennsylvania will have a splendid opportunity to benefit fishing this summer by waging a relentless war against watersnakes. At every opportunity these reptiles should be killed. Shooting them with small calibre rifles is good practice, and sometimes a rock, the only weapon at hand, is highly effective.

The watersnake does not fit into the modern scheme of fishing in our state. For better fishing, these reptiles must be thinned down.

A dead watersnake means more fish for the fishermen.

****

THE FISH COMMISSION IN PENNSYLVANIA

(Part Five)

------

by

OLIVER M. DEIBLER,
Commissioner of Fisheries.

PROTECTION

At the present time, there are in Pennsylvania a number of private trout hatcheries where trout are artificially grown for marketing purposes, several large goldfish hatcheries and numerous small private plants used for the propagation and sale of minnows for bait and stocking purposes. All private hatchery establishments are operated under licenses issued by this Board. Our field men frequently visit these establishments and when requested give advice on fish cultural subjects. Special reference is given to the private trout hatcheries, these plants having been developed to a tremendous business, the largest of them representing investments of from $150,000 to $200,000 each.

The Field Service and Research Service over-lap to a great extent and are both under direction of the Deputy Commissioner of Fisheries who has a wide knowledge of practical aquatic biology, modern fish cultural methods, and the problems confronting our various hatcheries.

The Research Bureau deals with problems from many angles, which directly or indirectly, have a bearing on all fish life. Principal among these are fish diseases, fish food, and biological surveys of our water areas. In the wide field covered, no one investigator could become very efficient on all questions involved, nor could the Board carry a scientific staff covering specialists in all branches. Therefore, the Deputy, with the consent of the Board, has the privilege of calling in outside specialists on various phases of the work encountered.

This Bureau also has at its disposal a very complete reference library and has investigators, constantly digesting new publications that are issued, so that no time will be lost working on problems already solved by other investigators.

The Board has a slogan that is posted along our waters, public camp sites and highways, which reads - "WANT GOOD FISHING,OBEY THE LAW." In our judgment nothing could be more true. Regardless of how extensive a production program is carried out, little could be accomplished if the laws were not enforced. Roughly, the enemies of conservation may be classed as two groups: fish predators and wilful law violators. The first group takes considerable toll of fish life, However, in the second group, many apparently have come to us to slay and eat. Those and others like minded, were it not for fear of the law, would rake our lakes and streams as with a fine tooth comb. To them, the preservation of wild life seems but childish play and unless rigid law enforcement prevailed, they would be a very serious menace to our work. The responsibility of law enforcement rests with our warden service, together with assistance given us by the State Game Protectors and State Police who are authorized under the law to assist in enforcement of the fish laws.

In our protective service we have two classes of wardens: Special and Regular. Upon written application of any properly organized fish protective association or on the written application of any association or individual owning or leasing waters, the Board is authorized to appoint special fish wardens. These men are not expected to devote much of their time to this work, as they receive no salary or expenses, nor do they receive any part of the fines. But the fact that they are known as special fish wardens in their own community, has a good moral effect on violators and they are doing good work in this way.

Under the Administrative Code, with the approval of the Governor, the Board is authorized to appoint men to the service known as regular fish wardens. At the present time, this corps consists of twenty-seven men. Their training is based on a semi-military principle. Obedience, service, loyalty, and efficiency must govern their actions. Without these qualifications this small corps of men in covering so large a territory could not have established the record for convictions which they now hold. New applicants must submit the best of reccommendations and be prepared to pass a rigid physical examination. If an applicant passes the requirements, he is placed on probation and turned over to an old line warden for a course of law enforcement in the field. To become a good officer, his knowledge must be varied. He must be able to identify different kinds of fishes, birds and animals of his state and know the seasons and bag limits of each. He must familiarize himself with the waters of the State, be able to conduct investigations, prosecute violators, to differentiate between technical offenses and wilful violations and to talk intelligently on the program and work of the Board, covering all its branches.

(To be continued)

STRANGE CATCH

While casting a hair frog for bass on a reservoir in western Pennsylvania last season, Kenneth A. Reid, member of the Fish Commission, made a strange catch. In the dusk that had fallen over the water, he noticed a creature swimming that left a V in its wake. A moment later, he cast at it, and hooked it.

To his amazement, instead of staying in the water, it took wing. It circled wildly above his head, causing the fly rod to bend to the impact of its rush. Finally, it was brought close enough for Mr. Reid to see that he had hooked a large bat. He experienced considerable difficulty before finally killing the chattering creature. This was the first time, he reports, that he has ever observed a bat swimming in the water.

****

BIG BAIT - BIG FISH

Harry Gates, deputy game protector of Stoddartsville, is a convert to the idea that it takes big bait to land some of the giant brown trout lurking in Lehigh River. An incident that occurred on May 4, according to Warden Russell J. Womelsdorf, of Kingston, confirmed Gates' belief in "big bait - big fish."

He had hooked a seven-inch chub while using angleworms for bait in the Lehigh. Bringing it in, he saw a swirl in the water, and a 19-inch brown trout carried on the fight where the chub had left off. Gates made his catch of the big trout in an unusual manner, he reports. Believe it or not, says Harry, that trout held fast to the chub, although it was not hooked, until he lifted it, in addition to a stump about which his line was tangled, from the water.

****

FORKED SPRINGS

by

T. H. HARTER,
Member, Board of Fish Commissioners

The Fish Commission's most recent project, stream improvement and a trout raising station on Spring Creek, near Bellefonte, is well under way. The work is centered on mammoth springs, Forked Springs, having a water flow of from 2800 to 3000 gallons a minute and a temperature of 49 degrees. This splendid source of water supply, emerging from the base of a steep ridge, will provide abundant water of proper temperature for thousands of trout to be raised in a series of ponds now under construction.

Spring Creek, cutting its way between wooded ridges, enters meadowland at the upper tip of the Fish Commission's tract. The beauty of the stream, one of the outstanding trout waters of the east, adds a picturesque touch to the scene. Long sweeping riffles, eddies, and stretches of still water make Spring Creek a trout fisherman's ideal. In development of the Fish Commission's project, it will be a major factor.

With the stream improvement program advocated by the Fish Commission gaining momentum in every section of the state, this phase of the drive for better fishing will be displayed as a feature at Forked Springs. Of particular interest will be a dam of the type advocated by Edward R. Hewitt, eminent authority on stream improvement. A sidechannel has already been cut at the upper tip of the project to deflect the current of Spring Creek while the dam is under construction. Other improvement features to be placed on Spring Creek are boulder and log wing dams, current deflectors, which serve to put the current to work in forming ideal pools for trout, and winter holes to provide good wintering quarters for the fish. An abundant supply of natural food, minnows, crayfish, and scuds, commonly known as freshwater shrimps - is present in the stream, and the fact has been definitely established that stream improvement will increase the food supply.

The major spring has been enclosed, and its elevation raised two feet. A small aeration system has been installed, and the former channel of the stream from this spring changed, so that, instead of following the base of the ridge, the water now pours directly into Spring Creek. Later, when the first series of trout ponds have been installed, at a point four hundred feet downstream from Forked Springs, the water will be diverted to these ponds. Sixty-four ponds in the first two units to be constructed will be started soon. Each of these ponds will be 100 feet in length and eight feet wide. As plans now stand, they will have somewhat the appearance of a checkerboard. The first series will veer toward the creek, the second series toward the base of the ridge, as an aid to assuring the full benefit of the water supply for trout held in these areas.

Spring Creek itself, fed almost exclusively by thirty-five big springs in its course, will provide additional pond space for growing trout, brook and brown, to six inch size and over for stocking. A side channel has been excavated at a point about 100 feet upstream from the big spring, and three temporary ponds have been built. These ponds, supplied entirely with water from Spring Creek, will be used for experimental work. Trout will be placed in them for observance on growth and reaction to the water supply.

A drainage canal has been excavated at the base of the ridge below Forked Springs, and an open flume from the spring to a point where the first series of pools will be built. A crew of fourteen men have been working on the project. Two tractors, a steam shovel, and a number of dump wagons have been in use for some time, although wet weather has proved a handicap.

Forked Springs is in the first stage of its development. Even now, however, the great possibilities of this new tract are apparent. Serving as it does a dual purpose - stream improvement and trout raising - it offers an ideal opportunity for one of the most constructive steps taken in recent years by the Fish Commission.

With constantly greater demands being placed on our trout waters by an increasing number of anglers, and the apparent need of improved trout waters in the fishing limelight, this latest development in the drive for better fishing comes at an opportune time. Its completion will mean many additional thousands of legal size trout for stocking purposes and serve as a practical demonstration for our fishermen on just how they may better their sport by improving the waters they fish.

Forked Springs, in brief, will fill an up-to-the-minute need for the fishermen of Pennsylvania.

****

VEGETATION IMPORTANT IN STREAM IMPROVEMENT

The food factor is vital in all improvement work. This is simply another way of saying that trout production on any stream is in direct proportion with the amount of food contained therein. Trout forage may be increased by introducing aquatic vegetation in conjunction with improvement work. This aquatic growth constitutes rich production areas for aquatic organisms, and sometimes is self-established following installation of dams, deflectors, and covers on our streams. Types of food essential to trout growth have been discussed in former issues of the ANGLER. A brief resume of these types shows definitely their relationship to vegetation in the water and along the shoreline.

Trout forage is classified under three major heads - aquatic, that living its entire life cycle in the water; semi-aquatic, living its life cycle partly in the water; and terrestrial, with a life cycle entirely on land. The aquatic group is highly essential,because this type of food is a stable supply, available at all seasons of the year for trout. Examples in this classification are cold water species of minnows, crayfish, and smaller aquatic organisms, such as the scud or fresh-water shrimp. It is obvious that the introduction of more vegetation and creation of better living conditions for trout will automatically tend to increase this type of food through affording it more protection and better breeding areas.

Under classification two, semi-aquatic, may be grouped insects that deposit their eggs in the water. An example of this group is the caddis fly. Hatching, the young insects rise from the stream bed to the surface, and at this stage are an important item in the food supply of trout. Insect hatches are, of course, seasonal, and dependent upon water temperatures. The terrestrial group comprises insect and small animal life that may fall accidentally into the water. Grasshoppers, crickets, and (in the case of exceptionally large trout) young mice are examples of this class of forage.

Stream improvement has an important bearing on all three groups. Beds of silt, slack water areas, and increased shelter on the stream bed provide suitable conditions for growth of aquatic vegetation. Dams and deflectors, plus stream bed shelter, aid this growth. Improved areas encourage insect hatches. Shelter on the stream banks, increased growth of brush, trees and other vegetation, furnish suitable living conditions for the terrestrial form of trout forage.

A form of deflector that has been tried successfully in Michigan, the V-deflector, is built on the principle of creating a strong, swift channel at mid-stream, affording good conditions for aquatic vegetation growth in slack water below the deflector. It is suitable for straight stretches of water, and is constructed with the deflector wings, based in each shore and quartered downstream. Two logs in each wing, firmly wired together and staked, are based with rocks on the upstream sides. If greater height is desired, other logs may be firmly fastened to the base structure, until the deflector is flush with or slightly below the summer water level of the stream. This deflector, the boulder and log wing deflectors, and dams create areas of still water below their tips that are often ideal for growth of vegetation.

Water-cress, common to many of our Pennsylvania streams, may be induced to grow in such areas. Clumps of water-cress, tossed into the water, lodge in suitable locations, with subsequent growth. Other types of trout stream vegetation that may be mentioned are several species of water buttercups and Callitriche or water starwort.

This aquatic vegetation is a worthwhile consideration in stream improvement. Weed beds in our trout streams, plus dams, deflectors, and increased shelter constitute a forward step to better fishing.

****

CATCHES GOOD THIS YEAR IN NORTHKILL

Stream improvement work on the Northkill Creek in Berks county is already bettering fishing conditions in that stream, according to a recent report received by the Fish Commission. Members of the North Western Berks Rod and Gun Club, who installed many dams and retards on the Northkill last year, are enthusiastic over results of their work.

Included in some of the fine early season catches made on this improved stream was a creel of 18 fine brook trout taken by Charles Henninger, veteran Strausstown angler.

****

HERE AND THERE WITH OUR ANGLERS

From wardens in many sections of the state come reports of fine trout fishing, despite cold weather and high water. Present indications show that a banner season is in the making.

A 23-inch brown trout was taken from the Frankstown branch of the Juniata by Landis Robison, Canoe Creek, according to Warden Lincoln Lender of Bellwood. Warden Frank Brink, Milford, Pike county, reports the taking of a 25-inch brown trout by Edward Bosler in the Sawkill Creek. The big fish weighed 5½ pounds.

After reading PENNSYLVANIA ANGLER please pass it on to friends who like to fish.

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PENNSYLVANIA ANGLER

PROPERTY OF THE
PENNA. STATE LIBRARY

NEWS BULLETIN FOR FISHERMEN

JUNE, 1933

P38.36
1.6

BOARD OF FISH COMMISSIONERS

O. M. Deibler, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. Deibler, *Chairman,* Greensburg
John Hamberger, Erie
T. H. Harter, Bellefonte
M. A. Riley, Ellwood City
Dan R. Schnabel, Johnstown
Leslie W. Seylar, McConnellsburg
Edgar W. Nicholson, Philadelphia
Kenneth A. Reid, Connellsville
H. R. Stackhouse, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

Alex P. Sweigart,
Editor,
Harrisburg.

PENNSYLVANIA ANGLER

June, 1933.

IN MEMORIAM

In the passing of Hon. T. H. Harter, of Bellefonte, Pennsylvania conservation has sustained a deep loss. During the ten years he served as member of the Board of Fish Commissioners, Mr. Harter endeared himself to associates on the Board and sportsmen who knew him as one who placed the high needs of conservation above every other consideration. An ardent sportsman, he derived great happiness in fishing and hunting, and had a keen practical knowledge of nature.

At a recent meeting of the Board of Fish Commissioners, the following resolutions were adopted in commemoration of his years of service on the Board:

WHEREAS, It has pleased Almighty God to take from us the soul of our friend and fellow commissioner, Thomas H. Harter; and

WHEREAS, We are filled with deepest grief, and an inconsolable sense of loss by his being thus taken from us, nevertheless, we are not without hope that, while he has been removed for a time from our midst, we have the assurance that he is reaping his reward in some glorious existence beyond the reach of every grief and pain; therefore, be it

RESOLVED, That even though his form will be no longer with us, that his life and his example will live and be an inspiration to each one of us, to give, as he gave, his best efforts to this Commission, to his state, and to his country, and while we shall miss him at our councils for his sincerity and honesty of purpose, we shall endeavor to carry on as he would have helped us had he been spared; and be it further

RESOLVED, That these resolutions be spread upon the minutes of the Board of Fish Commissioners and that a copy thereof duly certified by the members of the Board, be forwarded to the family of Mr. Harter, to the Governor of the State, and to the public press.

O. M. Deibler,
Commissioner of Fisheries.

MEMBERS OF THE BOARD

John Hamberger
Edgar W. Nicholson
Kenneth A. Reid
M. A. Riley
Dan R. Schnabel
Leslie W. Seylar

SAVE UNDERSIZE BASS

by

OLIVER M. DEIBLER,
Commissioner of Fisheries

Pennsylvania's fishermen recognize in the black bass a fish of superb fighting qualities and a worthy opponent for their angling skill. It typifies the ideal game fish, and in many sections of the state, sportsmen are acclaiming a remarkable comeback in number of the bass schools. Present indications point to a splendid bass season, one of the best in the past decade. The large number of bass now in our streams may be preserved if our anglers use every precaution in taking undersize bass from the hook, and, if necessary, sacrificing the hook to save a small bass that has swallowed the lure.

Ideal spawning conditions during the past three years and heavy stocking of bass by the Fish Commission have been outstanding factors in the increase of the bronze battlers in Pennsylvania waters. Low clear water of fairly high temperature encouraged the male bass guarding their nests to care for the young until they were able to forage for themselves. Bass stocked from our hatcheries varied in size from three to five inches and were sufficiently matured to grow rapidly when released in wild waters.

In practically every bass stream in the state this season are thousands of bass ranging in size from six to nine inches. It is a recognized fact in fish culture, that the abundance of bass is in direct proportion to the supply of live food available. Black bass, largemouth and smallmouth, take heavy toll from species of forage fishes, and when the food supply dwindles, do not hesitate to prey upon their kind. Heavy fishing during the past five years has kept the balance of these game fish sufficiently reduced to insure abundant forage for the bass crop now in our waters. Schools of large bass of both species are to be observed almost any day in the clear water of our bass streams and lakes.

Our anglers, when they invade the bass waters on July 1, will have in their keeping the future of this splendid sport of bass fishing. Remember, that an eight inch bass, returned unharmed to the water, will be of sufficient size by next season to be taken legally and to furnish a gamy fight for the fisherman. In bait fishing, smaller bass frequently are hooked deeply. To tear a barbed hook from the gullet of an undersize fish is to sign its death warrant. Rather than resort to this method of releasing an illegal bass, cut off the hook. Frequently the hook, though embedded in the fish, will not be fatal to it. Every care should be taken in handling a small bass when it is caught.

Fly fishing for bass offers a thrill second to none for the angler. In this form of bass fishing, hundreds of our fishermen are finding ideal angling. The surge of a gamy bronzeback as it strikes the fly, and the test to which it places a light fly rod provide the highest type of sport. Here the barbless hook may be employed effectively. Even small bass are not hooked too deeply and their capture does not mean the depletion of the stock now in our waters. The fly fisherman who delights in casting the tiny feathered lures for trout, will find in the black bass an opponent worthy of his skill.

Our anglers this season will enact an important role in preserving for the future the fine bass fishing now available in Pennsylvania.

****

THE SUNFISH

(Part Two)

by

C. R. BULLER,
Deputy Commissioner of Fisheries

The eggs of the sunfish are very small and adhesive or sticky. As they are extruded by the female, they cling to the clean surface of the stones in the nest. A female will deposit from two thousand to six thousand eggs, the number dependent upon her age and size. The percent. of fertilization is usually large, but often nests will be located very close together, and where this is the case, the percent. of fertilization is not so great, due, no doubt to the interference of neighboring fish during the spawning period.

The period of incubation varies from seven to ten days. At this time the parent fish is constantly guarding the nest from invasion of other fish, bent upon destroying eggs or young. Although the sunfish is small, it is possessed of wonderful courage and is well able to protect its home, even from the large carp or sucker. During the period of incubation and the early days of the life of the baby fish, all sediment and foreign substance is kept from the nest and a good circulation of water provided by the fin motion of the parent sunfish. If the foreign substance is too heavy to be washed from the nest, it is taken up in the mouth and carried away.

Many times this object may be the hook of a thoughtless fisherman, and the sunny, endeavoring to protect its nest, picks up hook and bait, not with the intention of eating it, but to carry it from the nest. Its capture results in entire loss of the nest of eggs or young fish, as neither the eggs or young fish can survive very long without the parent's protection and care.

When the little fish first hatch they are so tiny that they can be seen only with difficulty by the unaided eye. When they break through the shell of the egg, they have attached to the lower portions of their body a tiny yolk bag or food sac. This provides food for the little fellows until they gain strength enough to leave the nest in search of food. By close observation, with the sun directly overhead, the bottom of the nest will appear like a mass of small diamonds scattered over the stones. These will be the bright little eyes of the baby fish. For the first few days after hatching, the young will lie on the bottom of the nest being gently fanned by the fins of the parent fish. As they gain in strength they will swim nearer the water surface, and when evening approaches will settle back among the stones in the nest. The parent sunfish are constantly on guard to protect them from enemies.

If the same body of water is inhabited by the black bass, this is a trying and difficult task, as five or six hungry little bass will surround the nest. If one approaches too close, the parent sunfish will dart at it. The little bass, being very quick and active, easily gets out of harm's way, but in the meantime the other bass have entered the home and devoured a number of the baby sunnies, getting out of harm's way when the parent sunfish returns.

When the yolk bag is absorbed the little fish leave the nest and protection of the parent sunfish and seek food along the shorelines or in the dense growth of aquatic plant life. Their chief food consists of tiny animal life present in the water. When first hatched, they will not resemble sunfish in shape, but by the time they are from six to eight weeks old, they can be easily recognized as

sunfish. On sunny days they can be seen in small schools lying near the surface among the lily pads and aquatic grasses. When disturbed, they quickly settle to the bottom among the plant life.

In the United States there are between thirty and forty different kinds of sunfishes, all native to the fresh waters of North America. In Pennsylvania three different species are commonly found, either one or all being present in most of our lakes, ponds and quiet streams. They are known as the Common Sunfish, or Pumpkinseed, the Red Breasted or Yellow Belly Sunfish, and the Blue Gill Sunfish.

The Common Sunfish

This little fish never attains a size large enough to satisfy any but the boy angler, yet it bites with a vim that makes one regret that it is not larger. In the United States it is found from Maine to the Great Lakes and southward to Florida. It also inhabits the waters of the upper Mississippi Valley. It is a very beautiful and compact little fish, colored greenish olive above, shaded with blue and the sides spotted or blotched with orange, the belly orange yellow, cheeks orange with wavy blue streaks, and lower fins an orange color.

The Red Breasted Sunfish

This sunfish enjoys a wide range as it is found from Maine to Louisiana. It attains a length of from six to eight inches and is considered a good pan fish. In color it somewhat resembles the pumpkinseed, the two being very hard to tell apart, except by the trained student. It grows to a larger size than the pumpkinseed, body not as much elevated, mouth larger in proportion and black spot on the cheek much longer.

The Blue Gill Sunfish

The blue gill is the aristocrat of the sunfish family and most important of all true sunfishes. It is known by many different names, such as the Blue Bream, Blue Fish, Coppernosed Sunfish, Dollardee, and many others. It is found in almost all parts of the United States, either being native to the waters or introduced. As a food fish it is of much importance and of the sunfishes is the one most often seen on the market. It is the largest of the sunfish family, reaching a length of from ten to fourteen inches and as a pan fish, it is said to equal the yellow perch, as its flesh is firm and flaky, and possesses a delicious flavor. It also holds very high rank as a game fish and when a fair sized specimen is hooked, puts up a battle that will test the skill of any angler.

It is easily distinguished from the other sunfishes as its color is a greenish olive on the back, becoming pale on the sides. The top of the head is dark green, cheeks have a bluish tint, the spot on the cheek is a rich velvet black, the sides have three or four broad greenish bars and the lower fins are all greenish. Old individuals often have a coppery red belly. The young of the blue gill do not possess all the colors of a mature fish. Their sides are more or less silvery with vertical greenish bands.

(To be continued)

THE WHITE SUCKER

Sucker fishing is a tradition with Pennsylvania's anglers. When the first settlers followed the waterways through the mountain passes into country that formerly had been penetrated only by red men and an occasional white trapper or trader, they found vast schools of suckers in the larger streams and many of the tributaries. Native to Pennsylvania's inland waters, suckers provided an important source of food for the pioneers. Great numbers were caught and salted down for winter use. During the colonization period, even the inroads of the settlers did not materially affect the supply of these fish. Not until stream pollution dealt a shattering blow to fish life did the sucker hordes decrease rapidly in number. Yet despite the limits imposed by industrialization on our streams today, this hardy fish is perhaps best known and most widely fished for of any species in the inland waters.

Greater protection and heavy stocking of suckers by the Fish Commission has resulted in a rapid increase in the supply in recent years. Hook and line fishing yields fine catches in winter and spring, and offers sport to thousands of anglers in many sections of the state. It does not, however, cut down the supply of adult suckers to a stage where few fish will be left over for spawning purposes. Of equal importance to the increase in number of the sucker schools is the stocking of millions of young fish. Instances are on record at the Fish Commission of the catching of over 300 suckers with hook and line by an individual fisherman during the months of February and March. One sucker weighing five and one-half pounds was caught this spring on a tributary of the Juniata River, and a number have been recorded exceeding four pounds in weight.

Still-fishing with hook and line is the most effective method for catching suckers. The year-round, Sundays excepted, is open season for these fish and the daily catch limit for an individual is twenty-five. In Pennsylvania, the average weight of suckers taken in the spring, just when they are starting their spawning run, is from one to two pounds.

Description

The common sucker, or white sucker, has a range extending from New England westward to the Rockies and southward to Missouri and Georgia. In body it is stout and rounded, increasing in bulk with age.

Its head is moderate in size, conical in shape, somewhat flat on top, and, for size comparison, is contained about four times in the total length of the body. On the under surface of the snout is the mouth. The lips of the mouth are equipped with rows of tiny flesh-like projections known as papillae. Two or three rows of these papillae are present on the upper lip.

The body, at the point of its greatest depth, is contained about four times in the length. Its scales are fairly large on the sides and ventral surface, merging into smaller, closely crowded scales on the upper surface and back. In color, the sucker is generally a dark green on the back, merging into lighter green or brassy on the sides. Young specimens are brownish in color, and are usually mottled with darker areas.

The eye of the white sucker is comparatively small, its diameter being contained about six times in the length of the head. The snout is contained slightly over two times in the length of the head.

The back, or dorsal fin, is prominent, having twelve soft rays. Pectoral fins, ventral fins, and anal fin are also soft rayed.

Habits

A bottom feeder, the sucker takes its food from the bed of stream or lake: Often in the wake of a school of these fish on feed the water may be slightly clouded. Their food consists of soft forms of aquatic or animal life, such as worms, larvae, and small mussels, and aquatic vegetation. They are active during the entire year, and frequently may be seen moving about beneath clear ice in the winter.

Suckers spawn in Pennsylvania usually during the latter part of March or in early April. Prior to the spawning run, when they move far up tributary streams, they gather in great schools at the points of juncture of these tributaries and the main stream. At this time, thousands are taken, as they feed voraciously on mild winter days. Often the spawning run occurs at night, and the splash of sucker schools may at times be heard in the darkness as the fish move over shallow riffles on their way upstream. After spawning, the adult fish return to the lower waters.

When taken during late autumn, winter, or early spring, suckers rank high as food fish. At that time, the flesh is firm and sweet, although somewhat bony. During summer months, the flesh becomes soft and is not considered so highly from a food standpoint.

Suckers are caught not only in warm water streams of the state, but in colder streams and their tributaries as well. They furnish good fishing in every section of their range where abundant, and provide, through their young, a valuable source of food for bass and other game fish.

In brief, this fish, while it does not possess the fighting qualities of bass or other game fishes of the inland waters, holds a deservedly high pinnacle in the esteem of Pennsylvania's fishermen.

****

A "MARKED" TROUT

Fishing in Cold Spring Brook, Warren county, two years ago, Dan Lamon of Warren hooked a brook trout. In the ensuing tiff, he was left with a section of the trout's lower jaw as a souvenir. This spring, while trying his luck on Hosmer Run, according to Warden R. C. Bailey, Dan caught a 13-inch brookie. And, says Dan, the identical section of jaw was missing from this fish as that taken from a trout three years before.

It was the same fish, he declares, regardless of seven miles distance on the Little Brokenstraw, three miles on the Big Brokenstraw, and a mile up Hosmer Run, intervening between the places where the two incidents occurred. And backing his argument, there's the missing piece of jaw.

****

HON. FRANCIS BAKER REPORTS GOOD CREEL

An ardent trout fisherman, Hon. Francis T. Baker, of Lewisburg, made a splendid catch of the speckled beauties on the opening day of trout season. On one of Union county's trout streams, Mr. Baker, who is chairman of the Fish Committee of the House of Representatives, caught 23 fine brook trout, ranging in length to ten inches.

****

THE FISH COMMISSION IN PENNSYLVANIA

(Part Six)

by

OLIVER M. DEIBLER
Commissioner of Fisheries

Education

Fish wardens are officers of the State, selected and sworn to do their duty, which often is not too pleasant. In other walks of life, peace officers usually have to do with humans, because of their shortcomings with other humans. The fish warden makes an arrest because a crime is committed against fish or game. Much of his work is done after night, while patrolling lonely mountain streams and lakes where, in making arrests, he is in constant danger of violence from habitual law breakers. Our Board maintains that waters cannot be adequately patrolled by use of the automobile and these men travel many hundreds of miles each year on foot, carrying their provisions on their backs and sleeping out-of-door, under all conditions. They are not allotted to any one section of the State and are subject to a call at any moment which may send them to a territory where they may remain away from their families for weeks at a time.

Education has done much to lighten the burden of these protectors, although some otherwise law abiding citizens still act on the principle that the fish laws were enacted to make fishing more difficult, and regard the warden as an officer to be outwitted. While it is the aim of these enforcement officers to make the fishermen realize that the laws were enacted to protect their interests and that the violation of these laws is an act of selfishness and is injurious to the law abiding citizen, the warden is prepared at all times to treat the sportsman courteously and fairly. Only nation-wide education in conservation of wild life has made possible enactment and enforcement of laws covering our fish conservation program.

The Board's educational work is carried on in a number of different ways. Lectures on fish conservation are given, on invitation, to groups in various parts of the Commonwealth, furnishing an important contact for the Fish Commission with the public and serving to crystallize interest in the work of fish conservation. Articles on the Board's work are released to newspapers of the state and comprise vital features in the work of the Publicity Service. This bulletin is issued each month, covering different phases of fish conservation of direct interest to our fishermen. Other bulletins dealing with fish culture have been printed. Through the medium of publicity our fishermen are in constant touch with the work of the Board.

In our educational work, we have many different types of people to reach. There are those who will not read publications, nor will they sit and listen to a lecture, but if the actual work of our Board can be visualized, they can be impressed. With this in mind, we have developed approximately four thousand feet of motion picture film, showing various features of the Board's work.

(To be continued)

WATERSNAKE SWALLOWS YOUNG

From S. F. Wetzel, Sunbury angler, comes word that on two different occasions he has observed watersnakes swallow their young to protect them. While this habit may not apply to rattlesnakes, he writes, watersnakes apparently have no scruples against the procedure.

Two years ago, according to Mr. Wetzel, he came upon a female watersnake with a number of young snakes, from five to six inches in length, lying about her. At the approach of danger, the mother snake opened her mouth, and the young ones sought shelter by running inside, every young snake seeking protection in this way.

After killing the adult snake, he dissected it and found the young reptiles very much alive.

******

TROUT "UP A TREE"

Speaking of those early season incidents that are spice to the sport of trout fishing, here is one submitted by Enforcement Officer Myron E. Shoemaker, of Laceyville.

"Foster C. Comstock, Wyoming County Republican Chairman, of Laceyville," writes Shoemaker, "is better known to his many friends as 'Dock.' Mr. Comstock operates a barber shop and has as an assistant a young man who is studying for the ministry.

"'Dock' was fishing on Scouten Brook when he had a good strike. He gave a quick and vigorous pull, and a trout about 11 inches in length started for the tree tops. However, a large limb overhanging the brook stopped its upward flight, and the trout was suspended in midair for some time while 'Dock' figured out how to get it in his possession. He finally climbed the tree, and edged out along the limb toward the fish. Then, just as his fingers were about to clutch the speckled beauty, it fell back into the stream. 'Dock's' son, Russell, who happened to be with him, says that it was no place for dad's assistant in the barber shop."

******

WARREN SPORTSMEN TO IMPROVE STREAMS

Stream improvement will be a major conservation issue with sportsmen in Warren county this summer, according to Warden R. C. Bailey, of Youngsville. Hosmer Run, Mead Run, and the East Branch of Tionesta Creek will be the sites for organized improvement work.

William J. Munn, ardent angler of Garland, plans, with the aid of a number of enthusiastic Garland sportsmen, to better trout fishing in Hosmer Run through installation of dams, current deflectors, and increasing available cover on the stream.

Boy scouts will play an important part in improving the East Branch of Tionesta Creek. They will assist Special Warden D. Gordon Titus, of Barnes, in this improvement project. Members of the Brokenstraw Fish and Game Club of Youngsville will improve Mead Run this year, and are enthusiastic over prospects for greatly improving trout fishing in the stream.

In line with improvement work, the Izaak Walton League of Warren has leased Cold Spring Run, a short stream of low temperature water, and will use it as a nursery stream for trout.

******

LOG COVERS AID IN STREAM IMPROVEMENT

July and August, the most effective time for improvement of trout streams, will, according to present indications, find hundreds of sportsmen in many sections of the state taking part in this work. This season of the year is a determining factor in the effectiveness of stream betterment. In the majority of instances, trout waters are at low level during midsummer, revealing sections most in need of improvement. From another angle, hot summer days are ideal for work in the cold water of a trout stream. The importance of concentrating this improvement program on major trout waters, that is, on waters that have been approved for stocking in the Fish Commission's stream survey, has been stressed. To improve a small stream that becomes dangerously low during drought periods is not advisable, as such streams maintain little or no aquatic life.

The following suggestions on stream improvement may prove timely. First, plan the work carefully. Go over the stream to be improved, checking on available material for construction of deflectors, dams, and covers - that is, logs, boulders, and fallen trees. Remember that deflectors, to be most effective, must be installed at a bend in the stream, along the right shore, if the stream bend is to the right, and the left shore, if the curve is to the left. Dams should be constructed only on streams of low temperature water that have a swift flow, in order not to warm the water to the detriment of trout in lower areas. Second, build with an idea of permanency. Haphazard construction often is of no avail in stream improvement, and frequently may be detrimental to trout in the stream. If logs are used in dams and deflectors, they should be securely based in the shore, firmly wired together with heavy galvanized wire, and staked. Boulder and rock construction should also be firmly based with large rocks for permanency.

When completed, an improvement project should have a number of log covers located at advantageous points on the stream. The necessity of increasing natural cover - brush, trees and other shelter on the shores, and aquatic vegetation in the stream itself - has been stressed in former articles. Built in conjunction with deflectors and dams, log covers serve a dual purpose of additional shelter for trout, and when properly constructed, provide additional pools through the digging action of the current beneath them. Practical stream improvement has been demonstrated on Michigan trout streams, under the direction of Carl L. Hubbs, John R. Greeley, and Clarence M. Tarzwell, of the Institute for Fisheries Research, University of Michigan. While some of Pennsylvania's trout streams are low banked, and similar to most trout waters in Michigan, many streams in this state are high banked and are adaptable, in instances where swift currents and low temperature water prevail, to log and boulder dams.

Log covers should be constructed flush with or slightly below the summer water level of a stream. Of the various types, the cover known as the triangle cover appears most suitable for improvement work in Pennsylvania. This cover may be effectively used in conjunction with log wing or boulder wing deflectors, and when properly built serves to form a fine pool or refuge for trout beneath. If built in conjunction with a log or boulder deflector it should be placed a short distance downstream from the tip of the deflector, so that the increased current will serve to form a pool beneath. The triangle cover should be based on the shore opposite the deflector. To be most effective, deflectors should quarter downstream.

Three heavy logs, wired firmly together in the form of a triangle, serve as a base for the surface logs, which are of smaller dimensions, and should not extend beyond the extremities of the base logs. These surface logs, wired to the base logs, should, when the cover is placed, run parallel to the current, butts facing upstream. The heavy base log on the upstream side should be angled slightly downward to give it the greatest possible digging power. Stakes driven into the stream bed should support the tip of the deflector slightly below the water level at the point farthest toward center of the stream. For greater strength the base logs should be lapped securely together. The strongest available stakes should be used. In placing the cover, one of the sides of the triangle should be based at the shoreline, and the base log face the downstream current. When installed in such a manner that the surface logs are slightly beneath the summer water level of the stream, this cover offers little opportunity for water-snakes, turtles, or other fish predators to use it for sunning purposes.

Another cover that has been tried successfully in Michigan is the square cover, which is suitable for installation in midstream. Two heavy logs, one at each extremity of the cover, serve as a base for this structure. The smaller cover logs should be firmly wired and stapled to the base. When completed, this cover should be staked firmly at midstream, with the surface logs running parallel to the current. Owing to heavy water pressure, stakes used in placing the square cover must be of heavy, strong wood, driven into the stream bed about five feet. This cover is particularly adaptable for uniformly deep streams.

Several current deflectors of the boulder type have already been installed at the Fish Commission's stream improvement and trout nursery project on Spring Creek, near Bellefonte. A plan for rotating the current from these deflectors is being considered, through installation of the deflector at a point farthest upstream on the left shore, placing another deflector about one hundred feet downstream on the right shore, and at a similar distance from the second deflector, installing another farther downstream on the left shore. These deflectors will be located in comparatively quiet water, and the one now completed has already created a splendid eddy, plus still water below its base that should serve as a good winter hole for trout.

****

ANCHORED WILLOW CLUMPS BENEFIT TROUT STREAMS

From Warden Horace P. Boyden, of Wellsboro, Tioga county, comes word of practical results of stream improvement projects installed two years ago. Larger mountain trout streams, he writes, are most effectively improved by construction of rock dams and deflectors. Particularly does this type of improvement benefit streams of swift current and very cold water.

Another idea that has worked effectively is the bending down of a clump of good sized willows and the anchoring of the tops of these trees with heavy rocks on a downstream angle. Later the submerged willows sprout, forming additional shade as they grow over the water, while the current of the stream cutting under the bank provides a shelter for trout. In three years, this type of improvement, Boyden reports, has converted a shallow riffle into a fine shelter for trout.

****

SPRING CREEK OPENING SET FOR NEXT YEAR

Extremely wet weather and high water have retarded construction work at the Fish Commission's stream improvement and trout nursery project on Spring Creek this spring, and delayed the date for opening which had been set tentatively for July 4. Owing to the delay, the project will be opened at the beginning of trout season next year.

****

HERE AND THERE WITH OUR ANGLERS

Trout fishing continues to furnish exceptional catches while fishing for warm water varieties, yellow perch, sunfish, catfish, fallfish, eels, and carp is improving steadily, reports indicate.

Dingman's Creek in Pike county yielded two record brook trout last month, according to Warden Frank Brink of Milford. A brookie, length 19 inches, weight three pounds, was landed by George Raub of Easton. Bait used was a golden shiner. Howard Case of Catasauqua caught a 17½-inch brook trout weighing 2¾ pounds.

The Jefferson County Sportsmen's Association will hold their annual picnic in Allahoe Park at Big Run on July 27, 1933. Feature events will be fly-casting, plug casting, trap, pistol, and fancy shooting, and teams from each association in the county association will compete in the horse-shoe tournament. Prominent speakers from the Fish Commission, Game Commission, and Department of Forests and Waters are scheduled to be present, according to the announcement.

A 21-inch bullhead catfish, weighing four pounds, six ounces, was caught in Holtwood Dam by Paul Martin, of Lancaster.

A drive against watersnakes and stream improvement will be features of the better fishing program planned by the Lancaster County Fish and Game Protective Association this summer, according to Ira E. Mellinger, president.

After you have read PENNSYLVANIA ANGLER, please pass it on to friends who like to fish.

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PENNSYLVANIA ANGLER

NEWS BULLETIN FOR FISHERMEN

JULY, 1933

P38.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. Deibler, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. Deibler, *Chairman,* Greensburg
John Hamberger, Erie
T. H. Harter, Bellefonte
M. A. Riley, Ellwood City
Dan R. Schnabel, Johnstown
Leslie W. Seylar, McConnellsburg
Edgar W. Nicholson, Philadelphia
Kenneth A. Reid, Connellsville
H. R. Stackhouse, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

Alex P. Sweigart,
Editor,
Harrisburg.

PENNSYLVANIA ANGLER
July, 1933.

SHELTER ON STREAMS VERSUS OPEN FISHING

by

OLIVER M. DEIBLER,
Commissioner of Fisheries

Nature's scheme tolerates no interference. Conservation annals, without exception, show that when man interferes with the balance of life and food necessary for maintaining that life as dictated by nature in her scheme of things, disaster follows.

It is my firm conviction that our Pennsylvania fishermen are looking to the future of the great sport of angling. The future is the keynote being sounded now by the Fish Commission in its constant efforts to better fishing for years to come. With this thought in mind, we must consider a factor vital to the very heart of our better fishing program - shelter in the form of vegetation and cover on our streams and on the watersheds they drain. Constantly the strain upon our fishing waters is being increased as thousands of Pennsylvanians are turning to this ideal sport. It is necessary for us, as fishermen, to realize that we must sacrifice the ease with which an open stream may be fished, for the more difficult fishing in a stream having adequate brush and shelter on its shores and cover in the stream itself, if real progress is to be made in the drive for better fishing.

The importance of shelter on our trout streams has been stressed before. It is equally necessary that our larger warm water streams, ponds and lakes afford cover and shelter for aquatic life common to them. Old stumps, fallen trees, and dense beds of weeds may make fishing in some areas of the warmer inland waters difficult. Counter to this slight inconvenience to the angler is a vast benefit offered by cover of this type for fish life. In the shelter afforded, fish may spawn, the young, after hatching, may find shelter until they have attained a size sufficient to venture into more open water.

Our trout streams are in even greater need of the protection afforded by trees, brush, and cover. Here the temperature factor enters, and the food possibilities provided are an issue. Let us consider, for example, a small spring run, rising in mountainland, and tributary to some larger trout stream. Its source, a spring having a water temperature of perhaps 50 degrees Fahrenheit, may emerge in a tiny rock-clad gorge, practically closed in by foliage of overhanging trees and fringed by ferns. The course of this spring run may be only a quarter of a mile in length, and nature has provided that brush and thick vegetation shall shade it until it enters the main stream. Shade is vital to it, keeping the water at low temperature to the point of juncture. If it is of sufficient size, it may serve as a spawning area for trout in the main stream. Here the fry will hatch, and until they attain the fingerling stage in growth will remain. A highly essential source of their food, insect life from the overhanging foliage, is constantly dropping on the surface during the summer months.

Sufficient shade holds not only this brook's secret as an ideal tributary to a trout stream, but its adaptability as a natural spawning ground as well. Remove this vital shade from the stream and its benefit as a cold water tributary is destroyed. Sunlight, penetrating the water, warms it, and lack of cover greatly reduces its availability as a good nursery stream which nature intended it to be. Certainly the sportsman finds little to attract him to this ravaged feeder stream. The few trout in it, if any remain, are of such small size that they are not to be considered as legal fish. As for the main stream, a vital source of low temperature water has vanished, and this essential tributary during hot weather has been robbed of the usefulness intended by nature.

Summing up on the subject of "Shelter on Streams vs. Open Fishing," our anglers must consider two alternatives: first, the clearing away of brush and foliage on the shores, tangles of logs and other obstructions in the stream itself, to make fishing easy; second, assisting nature to accomplish the best possible results by stream improvement and increasing the available supply of shelter.

I believe that there is little doubt concerning the course to be followed. In the first instance, easy fishing will mean fewer fish to be caught. It will mean streams devoid of much natural food for fish, and damaged to such an extent as fish producers as to retard for many years their rise to peak production. Every trout stream should have areas too dense to fish, areas that serve as natural feeders to more open water.

In the second course, a field is opened whereby the fisherman may aid directly in the better fishing program. The past century has witnessed waste of our natural resources unparalleled in history. Vast forests of virgin timber, nature's giant reservoirs, fell before the advance of the sawmill in Pennsylvania. Nature patiently resumed her task after the great log drives became history and today our watersheds are clothed with a splendid growth of young timber. Our streams and their sources in the timberlands are once more shaded in many instances and fed by natural reservoirs, the forests.

We owe to future generations of Pennsylvania's anglers and to ourselves the responsibility of assisting in every way possible the comeback of our streams that only nature can assure.

******

LUCKY FROG

Deep and mournful croaking of a bullfrog attracted the attention of H. M. Kunkle, Altoona angler, while he was fishing on the Raystown Branch of the Juniata River. It was midday, and the big green fellow apparently was making a great deal of fuss about an unusual occurrence.

Approaching the scene of the frog's lamentations, Kunkle saw a large watersnake, its fangs embedded in the foot of the "bully rum." Kunkle, who had a rifle with him, shot the snake. The frog, suddenly released, jumped high into the air in one of the most comical leaps Kunkle says he ever observed. Another record-breaking bullfrog jump, this time a broad-jump, carried the big green fellow to the safety of the stream.

******

THE HUNTSDALE TROUT FARM

The new trout farm at Huntsdale, Cumberland county, is producing thousands of legal size trout, and opportunity afforded for development of this recent project is exceptioal. The supply of water available is furnished by five giant springs, having an average flow of over 2,000 gallons a minute, and ranges in temperature from 52 degrees to 57 degrees. These springs have their origin in limestone soil and are unfailing, even during periods of intense drought.

Ponds at Huntsdale are now holding 60,000 trout, ranging in size from fingerlings to mature fish. Of the total number, 20,000 are brook trout, varying in length from six to 12 inches, 20,000 brown trout from six to 10 inches, and 20,000 fingerlings.

Construction

Fourteen permanent retaining ponds are now completed. Only one of the big springs, number 2, furnishes an adequate water supply for these ponds. Each of the new permanents is 100 feet in length and eight feet wide. The total depth is 24 inches, water depth 18 inches. These ponds have timbered sides and the spillways are also constructed of wood. The bottom is gravel, highly suitable for growing trout. They have been planned with the thought of utilizing to the greatest possible degree the supply of water available. Between each row of ponds is a space of eight feet, and it is planned to plant for shade in this area.

At the present time, construction work is forging steadily ahead, and preparations are now being made to build permanent ponds which will be supplied with water by springs 3, 4 and 5. A drainage ditch has been excavated and will serve as an adequate measure for control of floods in the event of high water in the valley above the project. This ditch is approximately 1,000 feet in length. A crew of eleven men comprises the force now at work on the construction program. Included in the equipment being used are a gasoline shovel and tractor.

Natural Advantages

Of exceptional advantage to the Huntsdale site are natural facilities for growth of trout retained in the ponds. Proper water temperature and an abundant supply of aquatic organisms, including the ascellus, are contributing factors not only to this growth but to the high coloration noticeable in the fish. Trout sixteen months old have attained a size of from nine to 12 inches, are broad in girth, and possess a vitality that suggests superb game fish. They surge to the surface of the retaining ponds, when insects fall on the water or hover near it, with a flash of color reminiscent of trout in pools on mountain or meadow streams. Many of the fish have fins of brilliant orange color, are beautifully marbled on the back, and have bright markings.

The temperature range of from 52 to 57 degrees in the springs varies slightly, if at all, during the hot summer months, and has a vital bearing on the rapid development of the fish. Constantly hungry, they consume over 1200 pounds of sheep lights and liver a week. This same temperature range apparently is helpful to the growth in the limestone water of great quantities of ascellus and cress bugs which afford a splendid balance in the diet of the trout being raised.

Huntsdale, still in the early stages of development, serves a dual purpose in the Fish Commission's stocking program. At the trout farm pond space is available for production of thousands of trout that are hatched in other hatcheries and transferred to the trout farm to be grown to legal six inch size and over. It is strategically located for stocking streams in central Pennsyl-

vania and represents a great saving in transportation costs for the restocking of streams in this area. Some idea may be had of the rapid development of the site when it is considered that during March, 25,650 trout above legal size, including 6,000 brown trout, were released to public waters.

******

MALE BASS "DADDIES" TWO SEPARATE BROODS

Spawning habits of the black bass, game fish supreme of Pennsylvania's waters, are studied with keen interest at Pleasant Mount hatchery where thousands of the young bass are raised to stocking size. At approach of the spawning season, a certain number of brood fish are allotted to each brood pond. This year the bass were placed in these ponds in three allotments with intervals of about five or ten days between each allotment. The first allotment had spawned, the eggs had hatched, and the baby fish were still on the nest when the last group of adult bass were released in the pond.

The females of the second group were all fully ripe and little time was available for them to choose a mate. Apparently they chose the first fish at hand, with a result that one female extruded her eggs upon a nest of young bass, and they were fertilized by the male which already had one family under his care.

When the fry already hatched rose from the nest, they were removed by the caretaker and placed in the nursery ponds. The second family was also hatched in due time under protection of the male. It is a known fact that a female bass frequently mates with more than one male. This is generally accomplished by extruding a portion of her eggs on the nest of one male bass, and then seeking another fish. However, the instance mentioned is the first observed where a female sought a male bass that already had a brood of young fish under his care.

******

MEDALS FOR BOY SCOUTS IN WATERSNAKE CAMPAIGN

In recognition of the splendid support given by Boy Scout troops to the Fish Commission in its drive for stream improvement, the Commission this year will award a medal to each scout who kills ten or more watersnakes, Fish Commissioner Oliver M. Deibler has announced.

"We realize", Commissioner Deibler said, in commenting on this most recent phase of the campaign against the watersnake, "that the Boy Scouts and other youthful Pennsylvanians will constitute the fishing army of tomorrow. In stream improvement, we have received wonderful and enthusiastic support from the Boy Scouts. To further this fine cooperation, we are inaugurating a drive against the watersnake, which we regard as an outstanding enemy to fish life in our waters.

"In this snake-killing campaign, we believe that the Boy Scouts can give valuable assistance. As a reward to each and every boy scout who, on his honor, asserts that he has killed ten or more watersnakes we will issue a conservation medal in recognition of his services to the cause of better fishing. These medals will be issued through the scoutmasters of each troop, who will verify the reports on snakes killed."

******

THE SUNFISH
(Conclusion)

by

C. R. BULLER,
Deputy Commissioner of Fisheries

Production of the bluegill sunfish at our hatcheries is an important feature in the Board's propagation program. At the approach of the spawning season for sunfish, a number of pairs of brood fish are allotted to each nursery pond. In order that the most favorable conditions obtain in these ponds, they are made as natural as possible for the adult fish. After spawning has taken place, the male sunfish hovers constantly over the nest. When the young have hatched, the parent sunfish are retained in the nursery ponds and are permitted to care for the baby fish in their own way.

Development of a hatchery strain of brood sunfish has been an important factor in raising sunfish under hatchery conditions. Accustomed as they are to conditions at the hatchery, mortality of the brood fish is comparatively light as compared to that attendant to introducing brood sunfish from wild waters. Each year, following introduction of this system of using hatchery-raised sunfish for brood purposes, has been marked by considerably less mortality among sunfish of all sizes retained.

The parental instinct in wild animal life has been studied for generations with keen interest, yet little is known as to what really endows the parents to do certain things for the best protection of their offspring. In the various fish families we have very striking contrasts. Some species will not hesitate to devour their own eggs or the newly hatched young, others take great care in the building of nests or homes, protecting the eggs and young fish from their enemies with a persistence that is to be greatly admired.

The sunfish is of the latter type. Just why nature endows the male sunfish with an instinct through which he places the value of his own life higher than that of the nest of unhatched eggs is not known. As soon as the eggs develop into true fish, the reverse is the case and he then places the value of the lives of the baby fish higher than that of his own existence. This has been frequently observed as one approaches the nest of eggs. The parent fish will readily seek protection by darting into deeper water, leaving the nest of eggs more or less at the mercy of enemies. When the little fish appear, however, he will not leave the nest at the approach of a foe but instead gives battle with all the vigor at his command to keep harm away from them.

The parental instinct in fishes seems to increase in proportion to the toll that nature intended to be taken upon them by enemies. The pickerel, for instance, has no parental instinct, giving the eggs or young fish no protection whatever. The baby pickerel makes its appearance in the water world early in the spring when there are few enemies present to destroy it. The sunfish make their appearance at the season of the year when they are readily preyed upon by the minnows, yellow perch, black bass, pickerel and others of the same season's hatch.

In a natural state, sunfish are classed as shore feeders. By preference, they usually lurk nearer the shores of waters in which they are found, taking food that may fall to the surface such as grasshoppers, crickets and other types of forage. They also feed near or on the bottom on aquatic types of forage.

******

"INLAND WATER TIGER" ---- THE MUSKELLUNGE

Ranking as "big game" in the inland waters of Pennsylvania is the muskellunge - killer supreme, insatiable in appetite, and attaining an extreme weight of over 50 pounds. A muskellunge taken last year in Edinboro Lake, Erie county, exceeded 46 pounds in weight, the Fish Commission's records reveal. It has been estimated that a muskie weighing 40 pounds represents several tons of other fish that it has killed to attain that size. Owing to its great size and voracity, the Fish Commission does not stock this giant game fish, but it occurs in a number of the streams and lakes of northwestern Pennsylvania. Better known as muskie waters, in addition to Edinboro Lake, are French Creek, the Allegheny River, Lake LeBoeuf, and Conneaut Lake.

These tigers of the fresh water are often rovers by disposition, moving like swift shadows from inlet to inlet in search of food, or if in an exceptionally good feeding ground, lurking near weed beds and striking swiftly at any fish that passes near. Game fish, food fish or forage fish constitute their aquatic diet, and seldom is there drawn a line of preference as to prey. Owing to the greater number of suckers present in waters they frequent, muskies take heavy toll from the sucker schools. Probably, if a checkup was made, it would be found that the majority of these fish taken on hook and line each year are caught on suckers being used as bait.

As a game fish, the muskellunge may be termed temperamental. Rev. A. C. Howe, a veteran angler, who has fished for these inland water giants and has killed many of them, regards them as superb game fish.

"I have been partly responsible for the death of about one hundred muskellunge," he writes. "Some of them came in like lambs, without a fight. Some went down and had to be dragged along the bottom. Some danced in all the way on their tails, and some have sounded and come up on the wrong side of the boat. The biggest one I have ever hooked got away, of course. The smallest hit a trout fly and was about the proportion of a third of a pencil. Sometimes they strike hard, and sometimes they strike lightly. As Emerson Jones used to say, "When they miss it's mystery, but when they hit, it's history." There is no sure way of landing a muskie, but it is always better to let the fish be the one who gets excited. If you have never had a real fishing thrill, go to one of our Pennsylvania lakes this summer and spend a few days fishing for muskies. You may not get one, but if you do the world will never look the same again."

In appearance, the muskellunge (Esox Masquinongy) is long and slender, built for speed and strength. Its diet is not limited to other fishes within its range. The young of waterfowl, even on occasion small muskrats, are devoured by this voracious fish. Pulling prey that swims on the surface beneath the water, the muskie usually drowns its victim. Sharp, piercing teeth arm its jaws and are slanted backward in a manner that gives its prey no chance to escape after it has been struck. These teeth may inflict serious wounds to the hands of a fisherman who does not handle a captive muskie with care.

The muskie, while larger and of greater girth than its cousin, the common or Eastern chain pickerel, is a true pike in appearance. Its head is slightly larger, and the cheek and gill cover are scaly on the upper portion and without scales on the lower section. The fins are soft rayed, about seventeen of these rays occurring on the single dorsal fin, which is located a comparatively short distance in front of the base of the caudal or tail fin. Generally about eight rows of scales occur on the cheeks and gill cover, and this scaly area is comparable in width to the eye, which is situated midway between the rear margin of the

gill cover and the tip of the lower jaw. Coloration varies somewhat in different waters. Generally, however, the color of the back is dark green, merging into bronze. The belly is grayish white. Young specimens are usually easily distinguished by dark vertical markings or stripes extending well down the sides. Occasionally, the muskie's coloration may be basically a dark gray marked with prominent dark spots.

This tiger of the fresh waters ranks as a splendid food fish, in fact, it has been classed by some authorities as one of the best fishes for table in the inland waters. The flesh is white and of exceptional flavor.

A savage battler, striking frequently at live or artificial bait, the muskellunge is a coveted prize for those anglers of Pennsylvania who would go a-fishing for "big game" in a stream or lake.

******

NEW TRAP EFFECTIVE IN WATERSNAKE CONTROL

A fair analysis of the watersnake and its habits, weighing any good qualities it may possess against its destructiveness to fish life, leads to its conviction as an outstanding enemy to the sportsmen in their efforts to better fishing in Pennsylvania. Snake-infested streams and ponds yield a heavy toll of all species of fish to this drab, squat reptile each year. Their rapid increase constitutes a threat to the drive for good fishing that may not be taken lightly.

An effective device for thinning down these reptiles is a watersnake trap that has been adopted and used successfully by members of the Eastern Anglers Association of Monroe and Pike counties. This trap is easily constructed and may be used on many streams and lakes. In principle, it is a square box, the upper surface consisting of a balanced lid. This lid is pivoted in the center at both ends of the box, in such a manner that a slight weight on either side will cause it to tilt, dropping an object into the box. On both sides of the box are screens, giving a clear view of the inside. It is most effective when placed beside a log or other object near shore that is used as a sunning place by watersnakes. A dead minnow or other bait placed on the center of the lid may serve as an effective lure.

It is significant that organized groups of boys, for example, the Boy Scout camps, are prepared to organize intensive snake-killing campaigns this summer on streams in the vicinity of their camps. Boys, under capable leadership, will have an opportunity to benefit greatly fishing of the future in which many of them will take part.

******

FIND OUNCE BULLET EMBEDDED IN CARP

While fishing in Tuscarora Creek, Juniata county, Edgar Beale, of Spruce Hill, caught a carp weighing ten pounds. Upon examining the fish, Beale found an ounce ball embedded just a few inches in front of its tail. It is believed that some individual shot at the fish but failed to wound it fatally. Apparently the bullet failed to prevent the carp from staging a normal effort to break away from the hook. Warden C. V. Long, of East Waterford, Juniata county, reported the incident.

******

THE FISH COMMISSION IN PENNSYLVANIA
(Part Seven)

by

OLIVER M. DEIBLER,
Commissioner of Fisheries

New Fishing Waters

In recent years, our schools have shown an increased interest in biology. Material for certain phases of laboratory work is difficult to obtain and it is a known fact that the pupil will take a great deal more interest if he is dissecting or studying a specimen with which he is familiar, than if it is material obtained from some biological supply house, furnishing, in many instances, foreign specimens. With this thought in mind, the Board furnishes upon request, preserved specimens, if they desire them. At a number of our hatcheries, public aquariums are maintained, attractively displaying practically all the common varieties of our native fish. These places are visited annually by thousands of people, including many troops of boy scouts and girl scouts, high school classes, and others.

Propagation, planting and protection of the various species of fish is carried on for the benefit of the people of the State, in the interest of healthful, outdoor recreation. Statistics tell us that scientists have added eighteen years to the civilized man's average life. Statistics also tell us that the working man's hours of leisure have been increased twenty per cent. in twenty years. The old saying that man works from sunrise until sunset, while woman's work is never done, is no longer true. Our work is part of the great program of our country's executives to make the leisure hours more worth while. Pennsylvania was not wholly unprepared for this great gift of leisure, but in order to keep pace with its looked for increase, an extensive program for its future development has been evolved by this Board, whereby opportunities will be developed for a return to the simple life along our waters.

At the present time, our State has available many miles of unspoiled lakes and mountain streams, and thousands of Pennsylvanians and others are taking advantage of these natural gifts to such an extent, that in order to keep pace with future needs, additional fishing waters are necessary. This work is being carried on by the creation of new fishing waters and the restoring of waters, which at the present time are unsuitable for fish life or in which the public are not allowed to fish.

Construction of a giant dam at a point near Hawley, in Wayne county, marked one of the first steps in creation of new fishing waters. The lake formed, known as Lake Wallenpaupack, comprises between seven and eight thousand acres in Pike and Wayne counties and affords outstanding fishing each year for thousands of Pennsylvania fishermen. After completion, Wallenpaupack was closed to fishing for a period of two years. A vast stocking program, started a number of years before, was brought to a climax during this period, when millions of pike perch, black bass, yellow perch, sunfish, catfish, and minnows were planted. In addition to fry, a large number of adult fish were released for natural propagation purposes. Since the date of opening this body of water for fishing, the Board has continued to stock it heavily each year.

Lake Wallenpaupack was first opened to the public for fishing on August 21, 1928. At that time, representatives of the Fish Commission estimated the number of fishermen present at 5,000. By Labor Day, a little over a month later, it was estimated that this number had increased to 10,000. Catches in the lake have been most gratifying, and a splendid season is anticipated this year. One catch of bass taken last season averaged over four pounds in weight per fish. Heavy creels of pike perch, sunfish, yellow perch, and other species have been taken, and this water is a mecca for anglers in eastern Pennsylvania.

The giant Pymatuning reservoir in Crawford county, now nearing completion, will have a shoreline of over 70 miles. This great body of water will also be stocked heavily with fish of the various species and is expected to provide splendid sport in the future for fishermen in western and northwestern Pennsylvania. The project is being built primarily for the purpose of absorbing floods and providing sufficient water during dry seasons of the year for domestic and industrial use in the Shenango and Beaver valleys. When completed, it will be several times larger than Wallenpaupack.

Our anglers in the southern counties find in Lake Gordon, Bedford county, a great producer of the largemouth bass, while in the southeastern section of the Commonwealth, sportsmen turn for thrilling sport with rod and line to the Holtwood and Conowingo dams on the Susquehanna River.

Holtwood Dam was built a number of years ago on the Susquehanna River at Holtwood, Pa., and extends to the vicinity of Safe Harbor, Lancaster county, covering approximately four square miles. Conowingo Dam, completed in 1928, is approximately twelve miles long. The dam proper is located in Maryland, but backs water into Pennsylvania for a distance of approximately five miles. The stocking of this area is being carried on through a joint agreement between Pennsylvania and Maryland. At the time of its construction, a conference in reference to fishways was held. The dam is approximately ninety feet high, and it was agreed upon by those who were competent to speak on the subject, including representatives from the United States Bureau of Fisheries, that it would be useless to attempt to construct a fishway, as there is no known fishway in existence which is practical for dams of this character. It was therefore agreed by the States of Pennsylvania and Maryland that in lieu of the construction of a fishway, the sum of $4,000,payable every year should be contributed to each state to be used for the purpose of stocking the Lake which was formed by the construction of this dam.

In Pennsylvania, we have approximately 100,000 miles of streams, varying from the tiny rivulet, to the mighty flow of the Susquehanna, Ohio and Delaware Rivers. These streams flow through all kinds of country, the undeveloped mountainous districts, agricultural areas, oil fields, coal fields, and areas having a dense municipal and industrial development. Principally, through the carelessness of modern civilization, portions of these waters have been made unfit for recreational purposes. Public opinion is demanding that the waters be restored to their natural purity. Through the work of the Sanitary Water Board, which has jurisdiction over these questions, Pennsylvania is moving ahead in solving many of the stream pollution problems. This has been brought about chiefly through the cooperation of the municipalities and industrial plants with this Board, and their work is gradually opening up for fishing many miles of reclaimed waters.

(To be continued)

ERIE ANGLERS TAKE UP FLY FISHING FOR BASS

The Erie Bait Casting Club has enjoyed a well attended indoor schedule and many new members have benefited by engaging in tournament bait and fly casting. Fly casting was adopted but has not been scheduled as an event although it is being considered for the 1933-34 schedule. Fly casting for bass and pan fish is a sport not to be overlooked, and fly casting enthusiasts can be seen on the peninsula shores shooting the lighter bass bugs and flies on waters that had known only live bait and the heavier plug and spinner fly lures. The results are gratifying and many dyed-in-the-wool trout fishermen have adopted this new use for this particular type of tackle.

******

NATURAL REPRODUCTION FACTOR IN TROUT STREAM IMPROVEMENT

Effective improvement of our trout streams should take into consideration the vital aid which nature can give. Trout over legal size released by the Fish Commission each year are potential spawners and, provided they are offered suitable conditions for spawning, play an important part in bringing the stream stocked to its production peak. With this thought in mind, sportsmen who plan improvement of the waters they fish may effectively better the sport through making available for spawning purposes every possible location..

In part, improvement devices, such as the current deflectors and introduced cover, are beneficial to natural increase in number of trout in a stream. Deflectors, through increasing the speed of the current, expose beds of gravel and pebbles. These beds, if far upstream, serve as ideal spawning areas for trout that move to the headwaters in autumn to spawn. Additional cover in lower waters serves as ideal protection for smaller trout dropping downstream while they are still in a fingerling stage.

Perhaps one of the most effective methods for aiding in the natural reproduction of trout is to make available for them every possible spring water tributary. During the drought, many of these feeder streams became clogged with muck. As a result, the swiftness of the current was impeded and the sluggish water became too warm. Where tributaries of their type exist, sportsmen engaged in stream improvement should clear the channels of muck. Overhanging brush on such a stream should not, however, be disturbed more than necessary. A garden rake is often suitable for use in clearing the tributary stream's bed. The idea is to concentrate efforts in the feeder itself without interfering with natural growth on the shores.

******

RADIO ADDRESS

Hon. D. R. Schnabel, Board Member of Johnstown, spoke over Radio Station KDKA Pittsburgh on Saturday, July 15th. His subject was "Bass and Warm Water Fishes."

******

CHICKENS, BEWARE

Chickens parading in the meadows near a trout stream, should be bred to know just what is a good worm and what worms are not to be trusted. At any rate, two instances reported recently indicate that chickens may be developing "game fish qualities."

From Warden Anthony Lech of Shenandoah comes word of the experience of Rock Michalowsky of St. Clair. Rock was enjoying the angling sport on Fishing Creek, when, on the back cast he hooked into a "feathered fish." With plenty ado including indignant squawking, a Plymouth Rock chicken was landed. And from all accounts, the experience of removing the hook from the strange catch was not too pleasant.

Special Warden Gus Anderson, of Grass Flats, Clearfield county, also had a "chicken catching" experience while fishing on Logan Branch, Center county. Using a red worm for bait, Anderson "over-cast" the stream, the hook falling on the opposite shore. A stately rooster proceeded to impale itself on the hook and raised rumpus aplenty before it was released.

******

HERE AND THERE WITH OUR ANGLERS

July, a month when every species of game fish may be legally taken in Pennsylvania waters, is of particular interest to fishermen owing to the opening of the season on black bass, wall-eyed pike, muskellunge, and pickerel. Outstanding catches reported by a number of wardens indicate that the present bass season will be a banner one.

A largemouth bass weighing 8¼ pounds was caught in Lehman Lake, Pike county, by William Schoonover, of Lehman Lake. Schoonover's catch was reported by Warden Frank Brink, of Milford.

On Saturday, June 10, the Monroe-Pike County Sportsmen's Association, whose headquarters are in Stroudsburg, Monroe county, gave a testimonial dinner in behalf of the personnel of the State Fish Hatchery at Pleasant Mount.

Bert Manross, North Warren, caught a smallmouth bass measuring 21½ inches, and weighing 4 pounds, 11 ounces, in Conewango Creek, according to Warden R. C. Bailey, Youngsville.

A wall-eyed pike weighing 9¾ pounds was taken in Conneaut Lake by Michael Boyle, according to Warden J. S. Cannon. James Striker, of Pittsburgh, caught a 15-pound muskie. French Creek is also reported to have yielded splendid catches.

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PROPERTY OF THE
PENNA. STATE LIBRARY

PENNSYLVANIA ANGLER

NEWS BULLETIN FOR FISHERMEN

AUGUST, 1933

P38.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. DEIBLER, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. DEIBLER, *Chairman*, Greensburg
JOHN HAMBERGER, Erie
M. A. RILEY, Ellwood City
DAN R. SCHNABEL, Johnstown
LESLIE W. SEYLAR, McConnellsburg
EDGAR W. NICHOLSON, Philadelphia
KENNETH A. REID, Connellsville
H. R. STACKHOUSE, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

ALEX P. SWEIGART,
Editor
Harrisburg.

PENNSYLVANIA ANGLER

AUGUST, 1933.

GOOD SPORTSMANSHIP MEANS BETTER FISHING

by

OLIVER M. DEIBLER,
Commissioner of Fisheries

Pennsylvania's fishermen of the present era must regret the ruthless slaughter of fish life in our streams that marked the nineteenth century. A period when seins, trapnets, and spears devastated inland fishing waters is in sharp contrast to modern conservation of our aquatic life. Slight consideration was given to the fact that vast hordes of fish could not survive this ruthless extermination, and the killer's code predominated. Far-sighted sportsmen of the era viewed with alarm this unparallelled waste of our fish and wild life. Their views, however, were given credence only when the slaughter was terminated by a well-organized group of men swayed by the sportsman's code.

Perhaps no illustration is more appropriate for this period of destruction than the virtual extermination of the sturgeon in our larger streams. A giant armored fish, the sturgeon is linked closely with creatures of a prehistoric age. During the period of exploration and settlement, vast numbers of sturgeon inhabited the rivers. Examples weighing well over 100 pounds were commonly taken. Strangely enough, the flesh of this great fish, which today commands a high price on the market, was then considered hardly edible. The low regard in which the sturgeon was held as a food fish, however, is not an excuse for the wholesale slaughter of these fish. In a number of instances, thousands were taken from the streams and strewn over the ground to serve as fertilizer. By 1900, the work of extinction was almost complete in the Susquehanna and Delaware rivers. The sturgeon slaughter goes down in history as one of the darkest chapters in the annals of Pennsylvania conservation. It marked the end of an era of wasteful exploitation of our fish life that moved hand in hand with destruction of the forests.

Only vast natural abundance of fish life in the streams and lakes of Pennsylvania could sustain such a prolonged period of slaughter. Early settlers of the Commonwealth regarded the red man as a savage. The "savagery" of the Indian, however, did not apply to conservation of fish and game. He killed only when food was needed, and the crop of fish and game was for him a vital source of livelihood. It may be truly said that the red man was America's first conservationist. White men who blazed the trails for the tide of colonization that was to follow them to new lands were also, in many instances, conservationists at heart, killing for food only when necessary.

The past has taught a grim lesson and that lesson is being applied today in our efforts to provide better fishing in Pennsylvania. I believe that a trite saying known to many of us - "You cannot eat your cake and have it, too," - serves to illustrate the point. When the supply of fish and game was ebbing rapidly away during the nineteenth century, the belief prevailed that the "cake" never would be consumed. That the remnants of a magnificent natural supply of fish and wild life was saved in time may be attributed in large part to realization by the public that drastic steps to halt the slaughter were necessary. The Fish Commission is now engaged in a vast restocking program to bring back to the greatest possible extent fishing comparable with that of seventy-five years ago. Behind that program, backing it man by man, must be the sportsmen of Pennsylvania. It is

essentially their program and it stands or it falls according to their dictate.

This issue of sportsmanship is, I believe, the most vital factor in our program. Incident after incident portraying the splendid spirit of our Pennsylvania anglers has come to my attention during the past two years. Many of our fishermen are demonstrating the true sportsman spirit during trips astream. No longer is the skilful angler judged by the number of his catch. Instead, his angling ability should and is being measured by the yardstick of sportsmanship. Real thrill in angling rests in the game fight a battling trout or bass can provide in its bid for freedom. In other words, the angler-conservationist considers the sport of fishing paramount, the size of the catch secondary. He takes home only the number of fish that can be readily eaten by his family.

Sportsmanship on our streams means a square deal for every fisherman in Pennsylvania. Restocking waters alone cannot restore fishing comparable to that of seventy-five years ago. A constantly growing army of anglers invade the inland fishing waters each year. They are guardians of this splendid sport. The Fish Commission, their representative, is financed by their fund, the fisherman's license fund, and in large part, this money goes directly to restocking streams and lakes depleted by heavy catches. When a fisherman is unsportsmanlike in taking fish, his act is injuring not only his own sport but the sport of hundreds of his fellow anglers. The angler's greatest contribution to the sport he cherishes is to play the fishing game according to the rules that govern it.

The following thoughts in the sportsman's code should be considered. Remember, that a fish returned unharmed to the water will furnish sport on another day astream. Take enough fish for the family table, but not more than are needed. Don't measure your fishing skill by the size of the catch you lug home to show to the neighbors. Play fair with the little fellows, whether they are bass or trout, pickerel or pike perch. Handle them gently in releasing from the hook. Remember that the future supply of fish is dependent on the supply of young fish available. Finally, for outstanding sport, try fishing with the artificial fly for bass and other warm water game fishes. Whether the fly used is equipped with a small spinner or is of the floating type is a matter of preference. Here is angling of the highest type, sport that is a true conservation method. The peak of this fly-fishing is attained through use of the barbless hook, and thousands of undersize fish will be saved each year if more anglers turn to barbless fishing.

A comparison of game conservation and fish conservation methods in Pennsylvania presents a strange paradox. In the instance of the Game Commission's program, protection of species threatened with extinction ranks as an outstanding achievement in world conservation. When, at the start of the twentieth century, for instance, the deer herds had been reduced to a point verging on extinction, strong measures for protection of this splendid big game animal were adopted. A thirteen-day open season for deer was instituted. Killing of more than one buck deer by a hunter during the open season was made illegal. The heavy toll of crippled deer was cut down by banning use of buckshot in deer hunting. This measure proved a great aid to conserving the deer herd, as deer presented an easy target when the shotgun was in use. Of equal significance was the banning of dogs in hunting deer. This protection policy has restored deer-hunting in Pennsylvania to a pinnacle that is a model for every other state in the Union. When the ruffed grouse was vanishing from our forests at an alarming rate, the season bag limit was reduced and the grouse is staging a fine comeback. If conservation, as the Game Commission has put it into effect, has brought about such outstanding results, why should conservation along the same lines not be beneficial to fishing improvement in Pennsylvania?

Now, consider the other side of the picture, the Fish Commission's program in its drive for better fishing. Every attempt to force through legislation reducing the creel limit, with the exception of a measure cutting the legal daily catch of trout from 25 to 20, met with failure at the last session of the Legislature. With our hatcheries being taxed to the limit to produce fish for the waters of the Commonwealth, we are confronted with the fact that some species of fish may be taken during the entire year in Pennsylvania. An individual fisherman may take in one year 56,840 fish of various species under the present law. I have personally heard fishermen at sportsmen's rallies boast of catching from 200 to 300 trout in a season. Apparently the thought of conservation was secondary for these anglers, and consideration for their fellow sportsmen who fished the same streams a matter of small amount.

Until we have laws that definitely curb this heavy killing of fish by skilful fishermen each year, the Fish Commission must work under a handicap. Education, while a necessary feature in the drive for better fishing, is secondary to the issue of fine, clean sportsmanship, sportsmanship that takes into consideration the thought of building, not destroying, the supply of fish now available in our waters.

I am firmly convinced that this type of sportsmanship will spell success in our better fishing program. We need more builder-sportsmen.

****

FIGHTING BULLHEAD STRIKES "BASS BUG"

Are bullhead catfish potential game fish? Several incidents that have been reported to the Fish Commission would indicate that they are. One battling bullhead last season struck a spinner with all the savagery of a bass. And to top the favorable "game fish" impression that this humble dweller of Pennsylvania's inland waters is creating is the following report of landing a bullhead on a floating lure. Hon. Francis H. Coffin, of Scranton, regards the big bullhead that struck a "bass bug" for him as a fish of real fighting ability.

"I was casting for bass on a Wayne County lake one night last month," writes Mr. Coffin, "using a fly rod and a deer hair floating 'bass bug' tied to imitate a large moth. It was quite dark, and I had just hooked a smallmouth bass, just a trifle under size. While I was busy releasing the bass, I heard the loud splash of a rising fish in the darkness, on the lake, or deep water, side of the boat. I made a hasty cast in the direction of the rise and was rewarded by a heavy strike. The fish jumped twice clear of the water and played exactly like a bass. After netting him and getting my flashlight on him, I was amazed to find I had landed a bullhead catfish, 16 inches long, weighing about one and a half pounds. I have never heard of a bullhead striking a floating lure before and certainly for gameness and fighting ability, this specimen was a corker.

"As the experience was a new one to me, I thought this might be of interest to other Pennsylvania anglers."

****

THE CRAYFISH

by

C. R. BULLER,
Deputy Commissioner of Fisheries

The crayfish, commonly used as bass bait, belongs to the class Crustacea, of the Phylum Arthropoda. The Crustacea are aquatic water breathing animals, whose bodies are covered with chitinous matter, hardened with a calcium substance, making a firm shell. The lobster, crab, shrimp, and daphnia belong to the class Crustacea. The Arthropoda are characterized by having jointed appendages on either several or all segments of the body.

In different localities, the crayfish differs slightly, but a description of one will fit them all. They inhabit the fresh water lakes, ponds, and streams, and are usually found concealed under rocks or logs, or may make homes by burrowing into the banks, where they lie with their heads towards the entrance of their hiding places. Because the shell requires certain calcium salts, they do not thrive well in waters not containing these minerals. This probably accounts for their scarcity in certain localities.

While preyed upon by many enemies, crayfish have certain means of protection. Their armor-like covering, their color, which closely matches the bottom of the body of water in which they live, their large pincers which are used as a weapon of offense and defense, and their habit of lying in their homes, facing the entrance, making it difficult for enemies to get within, may be considered most effective. They have a tendency to lie concealed during the day, and coming forth to feed at night. This habit also prevents them from becoming the prey of certain birds and other predators.

Ordinarily, in moving from place to place, the crayfish creeps along upon its stilt-like legs, of which there are five pairs, although the first pair, the pincers, is seldom used for this purpose. Its backward movement is more rapid than the forward movement. When alarmed, it generally starts walking backward and when quick escape is necessary, it bends its flexible, scoop-like abdomen underneath the body and thus by its motion, swims backward in a series of rapid jerks. It is also aided in this process by two oar-shaped appendages near the end of the abdomen.

The food of the crayfish consists of various types of small animal life, found in the waters, such as tadpoles, small fish, and water insects, and it probably feeds to a certain extent, upon bits of plant life. In eating, the large pincers are used to hold and cut the food, and the small pincers, on the second and third pairs of legs, to convey it to the mouth.

Because they are typical aquatic animals, their respiratory system resembles that of a fish, breathing by means of gills. The gills are attached to the bases of the legs, and lie within the branchial chambers, which are formed and protected by an extension of the shell, on each side of the thorax. A constant stream of fresh water is forced through these chambers from behind, by an oar-like movement of a part of the second maxilla. The maxillae are the paired appendages behind the lower jaw. The gills are supplied with circulating blood, which takes up the oxygen that is in the water and gives off carbon dioxide to the water.

Reproduction takes place in the spring. The eggs, commonly called berries, are attached by a sticky substance to the abdominal appendages. They are carried and protected by the mother until they hatch. When they hatch, the young still cling to the parent for a few weeks, after which they drop off and lead a separate existence.

The shell of the crayfish is the chitinous armor that incases and protects the body. From time to time, as the individual grows, the shell is shed to make room for body expansion. The new shell is very soft and because of this, the crayfish makes an excellent bait for black bass. During the early stages of growth of the shell, the creature is defenseless and generally stays hidden until the shell hardens sufficiently to give it protection. When specimens are confined in large numbers, those shedding their shells are soon eaten by the others. It follows that under certain conditions, the crayfish practices cannibalism.

****

BOARD MEMBER NAMED BY GOVERNOR PINCHOT

Clinton county, famous for its fishing and hunting, is now represented on the Board of Fish Commissioners by Roy Smull, of Mackeyville. Mr. Smull was appointed to the Board by Governor Pinchot, and succeeds T. H. Harter of Bellefonte, who died recently.

An ardent sportsman, Mr. Smull has been active for years in Clinton county outdoor circles. He has been constantly in touch with conservation activities in the central part of the state and is an advocate of practical conservation.

****

WARDENS ATTEND TRAINING SCHOOL

Instruction on stream improvement and intensive study of the Fish Laws featured the Fish Commission's training school at Marshall Lodge in Jefferson county during the week of July 17. In addressing the wardens, Commissioner Oliver M. Deibler explained the stream improvement program and stressed the vital importance of cooperation between the field forces of the Fish Commission and the Game Commission, through whose courtesy Marshall Lodge was made available to the Fish Commission for the 1933 school.

C. R. Buller, Deputy Commissioner of Fisheries, addressed the wardens and explained in detail various phases of fish culture and the distribution plan for fish now being carried through by the Board. Hon. D. R. Schnabel, Hon. M. A. Riley, and Hon. Kenneth A. Reid, Board Members, gave interesting and instructive talks on the work of the Fish Commission. H. R. Stackhouse, Executive Secretary, explained various phases of the fish laws.

During one of the classes, William G. Shaffer, Deputy Secretary of the Game Commission, explained the various phases of the work of the Game Commission. In the closing session, a highly interesting discussion on the use of pistols was given by Lieut. Robert M. Bair, of the Highway Patrol.

****

EEL CHUTES NOW LEGAL IN DESIGNATED WATERS; FEE FOR LICENSE, $1.00

Eel Chute Licenses are only issued for the following waters:

Susquehanna River:
  (a) Below the northern boundary of Berwick on the North Branch.
  (b) Below the bridge at the Northumberland-Lycoming county line on the West Branch.
Juniata River:
  Below Mount Union.
Delaware River:
  Below Easton.

A bill, passed at the last session of the Legislature and signed by the Governor, permits the taking of eels through use of eel chutes on designated sections of certain waters for the period beginning August 1 and ending November 30. To clarify rules and regulations governing the use of eel chutes, PENNSYLVANIA ANGLER offers the following copy of sections of a Special Eel Chute License for 1933, as issued by the Department of Revenue. The fee for this license is $1.00.

The following rules and regulations, governing the construction and use of eel chutes, are prepared pursuant to the powers and duties conferred on the Department of Revenue and the Board of Fish Commissioners by Sections 50, 220 and 251 of the Act of May 2, 1925, P.L. 448, as amended:

RULES AND REGULATIONS

1. Any species of Game Fish caught in any eel chute shall be immediately removed therefrom and set free into the waters from which they were taken.

2. The heads of no two wing walls when constructed side by side shall be closer together than a distance of twenty (20) feet.

3. No wing walls shall be constructed for more than three-fourths of the distance across any river.

4. No wing walls of any two chutes shall extend beyond each other at the upper end.

5. No wing walls shall occupy so much of the stream as to prevent the passage of canoes, boats, or fish at either side of the stream.

6. No chute and wing walls shall be set within one-fourth of one mile from each other.

7. The bottoms of all eel chutes used shall be made of well rounded wooden slats not more than two inches wide, so set or placed that they shall not be less than one-half inch apart when swollen by water.

8. A portion of the bottoms of said chutes shall be moveable, and such moveable part shall be removed or so adjusted as to make it impossible to catch fish in the chute between the hours of 8 o'clock in the morning and 4 o'clock in the afternoon. The bottom must also be removed or adjusted so as to make it impossible to catch fish on Sunday. The chute must be kept free of rubbish at all times.

9. Eel chutes shall not be erected or operated within a quarter of a mile of any fishway, chute or opening in a dam through which fish can pass when water is running through.

10. All chutes shall be entirely removed from the wing walls and dismantled or destroyed within one week after the closing of the legal season.

11. The license plate furnished by the Department of Revenue shall be securely fastened to the eel chute in a conspicuous place.

12. Eel chutes shall not be more than five feet long and the width of the entrance shall not be more than ten feet.

13. No person shall operate an eel chute except the owner of the same, and he will be legally responsible for any violations of this license. The owner or owners of an eel chute will be allowed necessary help in the operation of the same.

14. NOTICE: NO EEL CHUTE CAN BE CONSTRUCTED OR OPERATED WITHIN ONE-QUARTER OF A MILE ABOVE OR THREE-QUARTERS OF A MILE BELOW ANY BRIDGE WHICH IS USED AS A STREAM GAUGING STATION BY THE DEPARTMENT OF FORESTS AND WATERS.

15. This license shall be valid only during the hours from four o'clock in the afternoon until eight o'clock on the following morning. (Sundays excepted).

16. This license is good only between the dates hereinabove indicated, and must be carried at all times when fishing, or operating an eel chute, and exhibited upon the request of any officer of the Commonwealth.

17. When using this license you must also have your Resident Citizen's Fishing License and wear your button in plain view. This applies to every individual or persons engaged in, or assisting in the operation of the eel chute.

18. This license is void unless signed in ink by the person to whom it is issued, and who by such signature certifies that he or they are a citizen or citizens of the State of Pennsylvania.

ANY PERSON VIOLATING ANY OF SAID RULES AND REGULATIONS SHALL, UPON CONVICTION, BE SENTENCED TO PAY A FINE OF NOT LESS THAN $20.00 FOR EACH OFFENSE. IN ADDITION TO SUCH PENALTY, THE EEL LICENSE AND FISHING LICENSE OF ANY PERSONS CONVICTED OR SIGNING AN ACKNOWLEDGMENT SHALL BE REVOKED, AND ALL UNLAWFUL DEVICES, AND AND DEVICES UNLAWFULLY USED, SHALL BE FORFEITED TO THE BOARD OF FISH COMMISSIONERS.

****

LANDS GIANT PIKE-PERCH ON FIVE-OUNCE FLY ROD

A mammoth pike-perch or Susquehanna salmon that in all probability will take rank as the largest caught this season in Pennsylvania waters was landed last month at Egypt Mills on the Delaware River. The big fish measured $32\frac{1}{2}$ inches in length and tipped the scales at $10\frac{1}{2}$ pounds. Joseph Andrews, of Cementon, who made the catch, was using a five-ounce fly rod and lamprey eel for bait. Warden Joel Young, Fullerton, reported the catch.

****

THE FISH COMMISSION IN PENNSYLVANIA

(Conclusion)

by
OLIVER M. DEIBLER,
Commissioner of Fisheries

The Board is doing everything within its power to prevent so-called posting of lands upon which good fishing waters are available. In certain sections there are areas not available to the public because the land owners have posted their property prohibiting trespassing. According to law, where lands are properly posted, there is nothing for the Board or fisherman to do but abide by the provisions of that law. During the past year, in several sections of the country, it was brought to the attention of the Board that certain selfish individuals were trying to, or had leased, portions of streams that are known for their good fishing. It is the policy of this Board to discourage leases of this character, but of course, in most instances, we have had to deal with individuals who are thinking only of the dollars and not of the pleasure of which they are depriving the people who have fished these streams for generations.

Increased fishing and recently created and reclaimed waters are constantly increasing the demand being put upon us for fish and have led to the inauguration of an extensive future program for production and distribution. Like all other industries, we are constantly working to increase production per given area, and startling improvements in this connection have been brought about in the last few years by the cooperation of the practical and scientific minds of our personnel.

Principally, through the modern methods of disease control and fish feeding practices, the present hatcheries and fish farms are being developed to a much greater extent than had been anticipated. It is the present thought to develop established sites to their greatest capacity for fish production.

In concluding I would like to extend to each of you, an invitation to visit one of the Board's hatcheries. At any of the hatcheries you will find much of interest to you. The superintendents will be glad to place you in charge of competent guides who will give you all information possible.

If you are not a fisherman you are missing a great deal in life and I would recommend that during the present season, you give yourself a vacation along one of Pennsylvania's beautiful streams and I am sure it will be the beginning of many joyous days. Autumn, by the way, finds bass fishing at a peak in our waters.

It is my hope that this series of articles, outlining the work of the Board of Fish Commissioners, will lead to close cooperation between the fishermen and the Fish Commission.

****

GENERAL INFORMATION ABOUT POISONOUS SNAKES

Editor's Note: Following is an excerpt from "The Poisonous Snakes of Pennsylvania," by M. Graham Netting, Curator of Herpetology, Carnegie Museum, Pittsburgh, Pa. This intensely interesting bulletin, a practical treatise on poisonous snakes of the Commonwealth, their habits, and treatment of snake bites, may be obtained for a nominal fee of ten cents from the Museum.

WHICH IS THE MOST DANGEROUS?

An experienced snake collector, when asked to name the most dangerous snake in the world, might safely divide this questionable honor between the aggressive King Cobra of the Malayan region and the long-fanged Bushmaster of Central and South America, for these two serpents surpass other snakes in the ease with which they deal horrible death to enemies who tread too near. An inquiry as to the "worst" snake in a particular country or State may prove more difficult to answer, for the dangerous qualities of a snake depend upon many factors; the type and strength of its venom, the amount it injects, the speed with which it strikes or moves, its temperament, its numbers, and its habits, whether ground-living or tree-climbing. Furthermore a deadly snake which is rare or which inhabits unsettled regions is less dangerous to the general public than a less poisonous species which is common in civilized communities. The farmer's wife in Pennsylvania, with her bare footed children romping through wood-lot and pasture, fears the Copperhead more than the Banded Rattlesnake, which lives in the mountains where her husband hunts, protected by heavy boots; and statistics prove that her fears are justified, for in 1928 there were 26 recorded cases of Copperhead bites in this State and only 7 rattlesnake cases. Again, the secretive Coral Snakes of Florida and the southwest, with their short fangs and small supply of powerful venom, failed to bite a human being in 1928, so far as we know, while the Cotton-mouth Moccasin, with its longer fangs and larger supply of weaker venom, is known to have bitten 43 persons.

HOW FAR CAN A SNAKE STRIKE?

It is foolish to generalize about poisonous snakes, for the disposition of an individual varies under different conditions, and the dispositions of individuals of the same species differ as well. It is safe to say, however, that none of our poisonous snakes will chase or deliberately attack a human being. They generally endeavor to avoid encounters by retiring unnoticed, but if stepped on, touched, or approached too closely, particularly just before shedding when their vision is temporarily dimmed by the thickening of the old skin, or caps, over the eyes, they will strike viciously.

In a sense poisonous snakes are always on the defensive, for they rest in flat coils with the head, neck, and front part of the body lying on top in a loose S in readiness for a strike, and when moving they can draw back the head and strike in the same fashion, or they can merely turn and bite. The striking distance is never more than three-fourths of the snake's length, and is generally only one-third, but the danger zone about a poisonous snake is a circle with a radius as great as the length of the snake.

HOW DOES A SNAKE STRIKE?

The strike of a pit viper is a combination of a blow and a bite, and it is faster than the eye can follow. The normal strike may be sketchily outlined as follows: the muscles on the outer curves of the S-shaped part of the neck and body are contracted, thus thrusting the head forward; the mouth is opened to a wide angle, sometimes as much as 180 degrees; the fangs are erected by a special muscle and their sheaths are pushed back; the tips of the fangs are swung outwards; the fangs are stabbed into the prey; the body acts as an anchor and pulls on the head so that the fangs are embedded more deeply; the lower jaw is closed and at the same time the venom glands are squeezed; and finally, the neck muscles pull the head back. Our poisonous snakes do not lie in wait with gaping mouths, but instead the mouth opens as the snake strikes. Local poisonous snakes do not deliberately spray or "spit" their venom as some foreign species do, but, if the fangs miss an enemy, venom may be thrown accidentally for six feet. The tips of the fangs are revolved outwards so that the snake will not bite its own lower jaw if it misses its prey. At times only one fang may be erected, or only one may pierce the prey. The fangs are long, hollow teeth, which closely resemble curved hypodermic needles. They are located in the front part of the upper jaw, and in the pit viper family they are fastened to small, moveable bones so that they can be erected as the snake strikes. They are folded back against the roof of the mouth and covered with a sheath of flesh when not in use. Removal of the fangs does not render the snake harmless, for new fangs from the reserve supply soon replace those which have been removed or shed normally. The venom glands, or the bones to which the fangs are attached, can be removed to make the snake "safe" but these operations are difficult and seldom resorted to.

****

CATCHES DOLLAR BILL.

Fishing in Trout Run in the borough of Slatington occasionally yields more for the creel than fish. Donald Rowland of Slatington made an unusual catch in that stretch of water this spring. Having just landed a ten-inch sucker, he rebaited the hook and visioned a heavy stringer of fish when his cast was rewarded by a sharp tug on the line. To his amazement, when he retrieved the hook he found dangling from it a dollar bill. That closed the fishing expedition for Don, who is of the opinion that the fishing license fee is money very well spent. Warden Joel Young of Fullerton, who reported the strange catch, might have added that Trout Run holds an unusual distinction - producing fish that rank with the proverbial goose that laid the golden egg.

****

LASSOS SNAPPING TURTLE

"Lassoing snappers" is the latest side angle to fishing indulged in by George Zimmerman, ardent angler who is secretary of the Lehigh County Fish and Game Protective Association. George, who believes that conservation of fish is on an equal footing with his favorite sport of angling, has slight regard for that enemy of fish life, the snapping turtle. Following is his account of ending the career of a big snapper.

"I have taken up a new form of diversion which I choose to call 'Lassoing Snappers'," he writes. "The adoption of this form of sport came by accident and this is how it happened: I was fishing, that is flycasting for bluegills, in Monroe Lake near Stroudsburg and was having fair luck until a snapper began to stick up his head near the end of my line. I managed to chase him away half a dozen times by flicking the line. That made him mad, I guess, at least he looked so. Finally he came up alongside my line and no matter how often I shook it or what other motions I made, he refused to leave, that is, to duck under the water. Then I got up my Dutch, of which I have a lot, and resorted to some trick work of my own. There was the snapper's head above the water and here was I madder'n a hornet. I made up my mind to do something about it, so by a dexterous (no other word would express it than dexterous) twist of the line I managed to circle the snapper's head with a loop and by a sudden and quick pull the noose was tightened and in came the snapper to my side -- a monster 18 inches in diameter across the back and weighing, I should judge, ten pounds. Well, all I've got to say is that that snapper will not aggravate any more fishermen, for he has been in the soup a long time since."

****

HERE AND THERE WITH OUR ANGLERS

Interest in stream improvement is running high in a number of sections of the state. Warden Horace Boyden of Wellsboro informs the ANGLER that Blue Run, a tributary to Long Run has been improved by members of the Long Run club. Additional cover has been introduced to this stream, and a large number of young trout are to be observed in the pools.

Two outstanding catches made during the special June season for game fish below Holtwood Dam on the Susquehanna River follow: D. Meade Bell, York - 72 fish; 40 smallmouth bass, 8 largemouth bass, 10 crappies, 14 wall-eyed pike. These fish were taken on the York county side of the river. Joseph G. Shaffer, Lancaster - 80 fish; 34 smallmouth bass, 8 wall-eyed pike, and 38 crappies. Shaffer was fishing on the Lancaster county side of the river. The catches were reported by Warden J. C. Haffly.

A largemouth bass, weighing 6½ pounds and measuring 23½ inches in length was caught in Lake Gordon, Bedford county, recently by Bink Wilson, Cumberland, Md., according to Warden Lincoln Lender, Bellwood.

Members of the Lancaster County Fish and Game Protective Association are now at work improving Chickies Creek, Hammer Creek, and Indian Run in Lancaster county, according to Ira E. Mellinger, president.

Do You Want Good Fishing?

—Obey the Law!

Vol. 2

PENNSYLVANIA ANGLER

NEWS BULLETIN FOR FISHERMEN

SEPTEMBER, 1933

P38.31
1.6

BOARD OF FISH COMMISSIONERS

O. M. Deibler, *Commissioner of Fisheries*

MEMBERS OF THE BOARD

O. M. Deibler, *Chairman*, Greensburg
John Hamberger, Erie
M. A. Riley, Ellwood City
Dan R. Schnabel, Johnstown
Leslie W. Seylar, McConnellsburg
Edgar W. Nicholson, Philadelphia
Kenneth A. Reid, Connellsville
Roy Smull, Mackeyville
H. R. Stackhouse, *Secretary to Board*

"Want Good Fishing?
—Obey the Law"

Alex P. Sweigart,
Editor
Harrisburg.

PENNSYLVANIA ANGLER

September, 1933.

FOR BETTER BASS FISHING CONSERVE THE BAIT FISH

by

OLIVER M. DEIBLER,
Commissioner of Fisheries

Pennsylvania's drive for better fishing will succeed when, and only when, our fishermen turn to the conservation code. This conservation program does not, in a broad sense, apply only to saving bass and other game fish. It covers every type of aquatic life present in the inland waters. Nature's balance permits no interference, and in her scheme of things, minnows are as vital to good fishing as black bass. Destroy or seriously injure the crop of forage fish present in a body of water and the supply of game fish is destroyed or injured. A herd of cattle, fenced in a plowed field, could not exist. In the same light, a school of black bass, roving over a section of a stream devoid of food, must perish. Forage is and must be the answer to better fishing in Pennsylvania waters. In retaining this essential natural balance of our streams and lakes, the fisherman may play a prominent role. The toll taken from the game fish food supply in public waters for live bait annually may mean the difference between good fishing or poor in the future.

Game fish abundance hinges directly on the supply of forage available. Without exception, black bass, pickerel, wall-eyed pike and trout are carnivorous, requiring live food in immense quantities for proper growth and increase in number. It follows that to thin down the forage crop, comprised of minnows, stone catfish, helgramites, crayfish and similar species, is to injure seriously the supply of game fish dependent upon it. In brief, proper balance of life in the inland waters is the keystone upon which must rest the future of our fishing program.

Relationship between game fish abundance and the food supply is clearly illustrated in the instance of the black bass. Increase and decrease in number of bass in stream or lake forms an interesting cycle. When forage is abundant, bass increase rapidly in size and number. Inevitably, if they become too plentiful, the food supply is thinned down, resulting in a corresponding decrease in bass population. Game fish are cannibalistic, and failing to find sufficient other food, turn without hesitation to devouring their kind. In meeting the demand placed upon forage fish by game fish predators, nature has provided that minnows and other species are very fecund, that is reproduce large numbers of young. So long as this normal increase is not interfered with, the food supply in bass waters keeps pace fairly well with the natural drain upon it.

When bass were first introduced to Pennsylvania waters during the Civil War, a tremendous food supply was available. Favored by every natural factor, their increase in number was amazing. By 1900, these splendid game fish were present in larger streams and lakes in vast numbers. The taking of smallmouth bass weighing five pounds in the Juniata River, for instance, was not unusual. A constantly increasing toll was taken on the forage fish of our waters and in consequence, the bass schools dwindled. Other factors, of course, were also destructive

to the black bass. The ruthless advance of the sawmill, denuding forest lands of virgin timber, nature's reservoir, was forerunner to disastrous floods and freshets that swept the bass ranges. Illegal fishing was unchecked, and pollution, following rapid industrialization of the Commonwealth, killed thousands of fish; not only bass, but forage fish upon which they were dependent for food. This combination of factors resulted in rapid decrease in our bass supply, and served to bring home forcibly the realization that adequate protection and stocking were essential to preserve this form of fishing. Aided by heavy stocking with bass ranging in size from three to seven inches by the Fish Commission and favorable spawning conditions during the past four years, our black bass have staged a splendid comeback. Reports available from widely scattered sections of the state indicate that the bass cycle trend is upward.

Retaining the present supply of bass in our waters and attempting to increase it is of utmost importance to the fishing program. In line with this thought, conservation of the supply of natural food in bass waters is, I believe, a major step toward fishing comparable with that of thirty years ago. At the present time, the drain upon the natural food supply comes from two sources, first, the demand for this type of forage by game fish; and second, widespread use of minnows and other forage fish as live bait. Obviously, the first restriction, that of game fish to forage fish increase is imposed by nature and is a necessary factor in the natural balance of stream or lake. Our fishermen may aid in preserving this balance by turning from live bait to artificial lures for their sport.

Fishing with artificial bait - flies, spinners, and other lures - is rapidly coming to the fore as a favorite method of angling. The advantages in fishing of this type are three-fold. First, it relieves the drain upon the supply of forage fish in our waters. Second, it permits the fisherman to match his skill against the cunning of a fighting bass, pike-perch, trout or pickerel, and relieves him of the bother incident with keeping bait alive and lugging a minnow pail on his fishing trip. Third, and most essential, this type of angling will save annually thousands of undersize game fish that taken on live bait are killed. From the standpoint of catches, some of the record-breaking fish of each season landed in our waters are caught on artificial lures.

The conservation creed is, I believe, gathering momentum with our fishermen. We must realize that the sport of fishing is in our keeping, that the better fishing drive will succeed or fail according to the role the individual sportsman assumes during days astream. I am convinced that a major stride toward success in our efforts will have been taken when more anglers adopt artificial lures in fishing. Live bait is potential game fish food, and every minnow taken from the public waters means the removal of vital forage for bass and other voracious species.

Fishing for game fish with the artificial fly or fly and spinner, particularly the barbless fly, is undoubtedly the pinnacle of the angler's art. Taken on this type of lure, a game fish weighing one pound will stage a thrilling fight. Then there is linked to this form of fishing the added pleasure of precision in casting and the use of tackle light enough to give in every lunge of a battling bass or other game fish a keen thrill to the angler. Finally, and of greatest importance, fly fishing is a true conservation method within the grasp of the average fisherman. When a fisherman adopts this type of sport he is playing the fishing game according to the finest rules that govern it, and after all, one is only a sportsmen when he actually practices and insists on others Playing the Game according to the rules of True Sportsmanship.

****

FLY-FISHING FOR BASS

The black bass, a superb game fish, rightfully takes its place with top-notchers of the finny clans from the fly-fisherman's viewpoint. The swiftness of its strike and the lunging, spectacular fight it makes to break away when hooked, test skill and light fly tackle to the limit.

Pennsylvania fishermen are turning enthusiastically to this sport, and the following pointers on fly-casting for bass, contributed by Enforcement Officer Myron Shoemaker of Laceyville, are exceptionally timely. Mr. Shoemaker, a veteran fly-fisherman, has fished on the famous North Branch of the Susquehanna River, since boyhood. Following are his suggestions on fly-fishing.

With heavy catches of bass being made during the months of September and October, it becomes a question of not how many legal bass will be caught but rather how many small bass will be destroyed. Many true sportsmen sincerely regret the premature death of these small bass that swallow live bait. But there is a remedy for this destruction and every bass fisherman can assist in bringing back better bass fishing.

The remedy is "fly fishing", and once the fisherman catches a bass on a fly he will need no further encouragement. Few small bass are injured seriously by fly fishing. This is not a matter of theory but one of years of experience which any fly fisherman will readily back to the limit.

Numerous arguments immediately are brought forth against fly fishing, for instance, "the cost prohibitive", "too hard work," "too hard to learn" and many other foolish reasons without foundation. Most bass fishermen today are already equipped with a fly rod which they use for trout fishing or for bait fishing for bass. There is then to be added but a few flies at a very small cost. For the fisherman who does not have a fly rod the expense is not great and with proper care the rod will last for years. For the sake of undersize bass and for future fishing, not only for ourselves but for the coming generation, let us compare the cost of fly fishing with that of bait fishing.

The cost of live bait is usually from three to five cents for each bait and the average fisherman takes with him two kinds of bait, generally about twenty of each kind. Some desire a greater number. This entails a cost of from $1.20 to $2.00 per trip and if the bait dies the expense is greater, the trip may be ruined, and the next trip will be just as expensive. At the end of the day the catch may be large but the fisherman has unintentionally worked a great deal of damage. With the flies the first cost is a little greater but there is no loss for a long time and in the end the cost is much less, not only financially but from a conservation angle. The fisherman is always supplied with bait when using flies. The majority of flies today can be purchased for fifteen cents each and it is not uncommon to catch from forty to fifty bass on one fly before it is unfit for further use. With bait fishing one good strike requires a new bait.

Contrary to general opinion, it is not necessary to load up with a great number of patterns of flies. Flies tied on No. 4 eyed hooks are recommended and four or five patterns will serve the purpose for any fisherman. For the benefit of all concerned several good patterns are suggested. The Lord Baltimore with Jungle Cock Wing is highly recommended, the Cahill, Ruben Wood, Paramachene Belle and Wickhams Fancy are very good. This gives an assortment of colors from black to white. There are many other patterns which are popular but it simply becomes a matter of taste as to which pattern produces the best results for the individual.

Flies tied on eyed hooks last much longer than those tied on gut. The gut deteriorates very rapidly and the flies sometimes are a total loss before being used. The eyed flies are easily tied to the leader which should be single and about ten pound test. The silk worm gut can be purchased in coils for about $1.25 per coil and there is enough to last two years for the average bass fisherman. Leaders should be from three to six feet in length.

A small spinner of either brass or nickel is highly recommended and when attached to the eyed fly is very effective. A No. 1 or 2 size is recommended because it adds very little weight to the fly. Both sizes are mentioned as it is not uncommon to find one manufacturer making a No. 1 spinner and another making a No. 2 spinner of the same size. There also are many floating lures for fly rods which are very effective. If the fisherman wants real sport he should use a No. 12 dry trout fly when the bass are feeding on the surface. This will produce thrills that will not soon be forgotten.

A nine and one-half foot rod from five to six ounces is recommended for those who already do not have a fly rod. A small feather-weight reel which will hold thirty yards of line is sufficient and need not be expensive. The line is one of the most essential parts of the equipment and is the prime factor that makes fly fishing truly easy. The majority of beginners make the great mistake of using too light a line. The line must be heavy and either level or double tapered. If level, an F size and HEH for double tapered. It depends on the individual as to which type he may like best.

While practically the same fundamental rules are followed in all fly fishing there is a slight difference in fly fishing for bass due principally to the added weight of the lures to be used.

In wet fly fishing for bass the angler usually wades the stream with the current but if the current is not too fast sometimes good results are obtained by wading against the current as in dry fly fishing. In any event the fly should be submerged and allowed to flow naturally with the current, always keeping as tight a line as possible according to water conditions and not causing too much drag. Sometimes it is well to occasionally and slightly twitch or jerk the fly.

In using the fly and spinner the lure should be kept in motion a greater part of the time with the line always tight. The current always keeps the spinner in motion and sometimes it is well to hesitate before retrieving the spinner. The added flash of the spinner seems to supply just what the fish desires and the results are well worth while. This lure may be used by retrieving it against the current or across the current. If across much more water can be covered and it eventually straightens out with the current to be retrieved against the current. In the late fall fishing during October and even into November the fly and spinner are very effective if used along the shores where the water breaks into deeper water. If this is unsuccessful it may be used very effectively from a boat by trolling. Place a small sinker about six feet above the lure so that it will sink to the desired depth and let out from forty to fifty feet of line. When the bass hits there is immediately the buzz of the reel which adds greatly to the thrill. It is not uncommon to take many large bass in this manner.

The beginner must have confidence in himself and assurance that fly fishing is no mystery but truly easier than bait fishing, and he can almost immediately catch fish. The finer points of the art will develop rapidly with practice. The beginner must not be deceived and think that great strength is what is needed to become a successful fly fisherman. The rod is the supplied strength that hurls the line forward. It is not the fly that is cast but the line, with the rod supplying the carrying power and the line simply carrying the leader and fly

behind. When the line reaches its limit of flight, the leader and fly automatically leap forward and drop to the water surface ahead of the line. Great distance is not necessary to catch fish and from thirty to forty feet is sufficient. Distance if needed will develop with experience.

With the rod fully mounted there should be about twelve feet of line including the leader stripped from the reel and hanging loose from the tip of the rod. The rod should then be snapped back, and a back and forth motion with the rod continued until sufficient line is played out from the first cast. The left hand continually strips line from the reel while this back and forth motion is taking place until the desired length is out. Never allow the rod to go back over the shoulder but keep it in a direct line with the body or even with the hat brim or in a vertical position. When enough line has been stripped from the reel and played out the first cast may be made, and the line, held in the left hand, should be freed on the forward cast at the proper time to allow the line to slip through the guides. The rod at the finish of the forward cast should be in a horizontal position directly in front and slightly raised at once to be ready for the strike or, if using the spinner, the rod should be slowly raised to help keep the spinner in motion and the line tight. This will greatly assist in helping to bring the lure nearer the surface for the pickup just before the back cast. Do not raise the rod too far back so that it will interfere with the pickup and back cast which are made with one and the same motion. The left hand can and should assist greatly in bringing the lure nearer the surface for the pickup and the back cast and will allow the rod to be kept in the proper position. The line, which is retrieved with the left hand, should be held in a coil and at the proper time released on the forward cast. After the cast the line should be immediately picked up with the left hand and securely held in case of a strike. This keeps a tight line when the hook is driven home with the rod, because the fisherman can not use the right hand to thumb the reel as in bait fishing.

The pickup should be a snatch backward and brisk enough to start and carry the fly on its backward flight or back cast. The pivot for both the forward and back casts should be at the elbow and the forearm only should be used. Some prefer mere wrist action, either will work, but in any event never use the whole arm. Keep the upper arm close to the body and forget that it is there. Stop the rod on the back cast in a direct line with the body and allow time enough for the back cast to be completed. This will automatically be realized by the feel of a slight tug, when the forward cast should and must be started immediately with a brisk, choppy, downward stroke with the forearm. The line, leader and fly automatically follow through. A little practice on the back cast will perfect proper timing so that it will soon be a matter of reflex action. Never allow too much time on the back cast or be too quick on the forward cast as both faults will result in a poor cast or no cast at all. Never try to cast directly at the objective on the water but from two to three feet above. This not only allows the leader and fly to follow through properly but allows the fly to light on the water more naturally.

Any fly fisherman who is interested in bringing about better fishing and knows anything about the art will be glad to give assistance to any beginner. The moment the beginner starts he will never forget that he grasped an opportunity to learn the finest sport in the world.

****

INCREASING FISHABLE WATER ON PENNSYLVANIA TROUT STREAMS

Certain areas on trout streams harbor few if any trout. Anglers who fish these waters often pass up one section of stream to try a more productive area. As a result, stream sections offering better fishing must stand the strain of providing sport for practically all fishermen who try the stream. It is evident that if such waters provided uniformly good fishing, a maximum in sport would be afforded the angler and the supply of trout would be increased. Stream improvement offers a logical method in solution of this problem.

Sections of a stream deficient in number of trout will generally be found to have several distinct characteristics. Frequently they are exposed to direct rays of the sun. The banks often shelve gradually into the water, and the stream bed affords few hiding places for trout. Overhanging foliage from brush and trees on the shores, a valuable source of insect life that may drop into the water, is lacking. Finally, these water areas become so warm during midsummer that they are not suitable for trout.

Perhaps the first step to be taken in bringing these areas back as good fishing water is planting of trees and brush on the shores. Willow slips serve to form ideal shade, as they sprout quickly and the young trees grow rapidly. The interlaced roots of the willow provide good underwater cover for trout, while the foliage spans well out over the stream. Insects take well to foliage of this type and are an almost constant source of forage during the hot summer months. Other brush transplanted in a manner that will assure its overhanging the edge of the stream is also beneficial.

Another, and equally important consideration, is creation of more shelter on the stream bed itself. If securely anchored, an old stump provides good refuge and drift lodging against it increases its efficiency as a shelter. Water-soaked logs and boulders also are effective shelter devices for midstream. Cover of this type serves as good protection for trout from their natural enemies.

Installation of current deflectors on areas having few trout is the most effective method for improvement of fishing. These deflectors are easily constructed, and, by putting the current to work form pools adaptable for trout. Three types of deflectors are most suitable for improving poor or barren fishing areas on streams - the log wing deflector, the boulder wing deflector, and the V-deflector. Where stream bends are numerous on the section to be improved, the boulder and log wing deflectors are suitable. The manner in which they are constructed has been described in former issues of PENNSYLVANIA ANGLER. They should be constructed with the idea of permanency in mind, and based firmly in the bank of the stream. When completed, these deflectors should quarter downstream and should be flush with or slightly above the summer water level of the stream. Straight stretches of water may be greatly improved through construction of the V-deflector, a device having two wings, similar to the boulder or log deflector, and based in each shore. The idea of this deflector is to concentrate the force of the current at midstream, thus aiding in aerating the water and forming good eddies back of the deflector wings. Improvement work, to be most beneficial, should be centered on barren or poor fishing sections of trout streams.

Junior Sportsmen in Clearfield County are taking a commendable part in the stream improvement program this summer, according to word received at the Fish Commission. A group of eighteen boys, under the leadership of Morris Brion are building dams, deflectors, and covers on Lick Run, one of Clearfield's famous trout streams. Incidentally, it was this stream that yielded the largest rainbow trout on record at the Fish Commission, a 27-inch specimen, weighing $8\frac{3}{4}$ pounds.

****

COPPERHEAD
OTHER COMMON NAMES
COPPER SNAKE, HIGHLAND MOCCASIN, CHUNKHEAD

SCIENTIFIC NAME

Agkistrodon mokasen (Meaning "moccasin with a hooked tooth")

Editor's Note: Bass fishermen frequently encounter the copperhead snake during trips astream. Owing to this fact, the following excerpt from M. Graham Netting's intensely interesting treatise "The Poisonous Snakes of Pennsylvania," is timely. Mr. Netting is Curator of Herpetology in the Carnegie Museum, at Pittsburgh, Pa., and his treatise on snakes may be obtained for a nominal fee of ten cents from the Museum.

DESCRIPTION

A small or medium-sized snake, usually with a copper-colored head. Generally light brown or pinkish gray with a series of large, dark brown or reddish brown markings on each side of the body. These markings resemble inverted Y's, or triangles with their points upward, when viewed from the side. Frequently, the points meet at the center of the back so that when viewed from above some of the markings resemble an hourglass in outline. There is a second row of small brown or black spots low down on each side.

SIZE

In Pennsylvania thirty inches might be considered the average size of the Copperhead. Specimens three and a half feet long have been taken near Pittsburgh in recent years. The record for the species is apparently a specimen four feet and five inches in length, reported by Dr. Ditmars.

HABITS AND HABITAT

Because of its secretive habits and nocturnal activity the Copperhead is able to exist in well-populated regions. One farmer, within ten miles of Pittsburgh, reported that he had killed forty-nine of these snakes on his property in a recent year. The Copperhead is inclined to lie quietly and to depend upon its protective coloration for safety. If approached it frequently vibrates its tail in the leaves, thus producing a warning as audible as that of a small rattler. This much-maligned snake will bite if trod upon, fight viciously if cornered, or slide away to safety when possible. I have never seen one act in as truly terrifying a manner as a harmless Spreadhead which is trying to bluff an enemy nor have I seen one fight as wholeheartedly as a harmless Blue Racer.

The Copperhead is more aquatic than either of our rattlesnakes, and I believe that it is more strictly nocturnal. It frequents moist places and occasional specimens are seen swimming in the daytime. Its habitat is varied for it may be found on steep, rocky hillsides, in rolling woods, in wet valleys, along dusty roads after dark, under rocks, logs or brush, in sawdust piles, fallen logs, or "sinkholes." In the fall the Copperhead retires to a den which may shelter Banded Rattlesnakes and harmless species as well.

REPRODUCTION

Mating probably occurs in late April or May. From three to nine young are born late in August or in September, at which time the females are generally near the hibernating den. The young are born enclosed in thin, transparent membranes which they generally break through shortly after birth, as in the Massasauga and Banded Rattlesnake. The young have sulphur-yellow tails which they are said to move in imitation of grubs and thus lure unsuspecting prey.

RANGE

From Massachussetts southward to northern Florida, westward to western Texas, Kansas and Illinois.

DISTRIBUTION IN PENNSYLVANIA

The Copperhead has been definitely recorded from 38 of the 67 counties in the State. At one time it may have occurred in every county and even now it may be expected in all but a few counties.

PROTECTION AGAINST POISONOUS SNAKES

Snake bites may be avoided in one of two ways; either by wearing clothing so tough or so thick that fangs cannot pierce to the skin or by keeping so alert and observing so carefully that poisonous snakes are seen and avoided. I favor a combination of the two methods, for even a woodsman may step on a snake after dark. In the United States roughly 60 per cent of all bites are on the feet or legs, almost 40 per cent on the hands and arms, and only about one per cent on the trunk or head. Leather or rubber boots, or high shoes and leather puttees, give almost perfect leg protection since our snakes are not apt to strike more than twelve inches from the ground, and none of the local species are able to penetrate leather. In fact, one of my friends, who was wearing khaki trousers and wool socks, was struck by a Copperhead and the short fangs did not puncture the skin, the venom being discharged in the wool. Heavy canvas or leather gloves protect the hands adequately. Those who dislike the burden of boots and gloves must watch where they place their feet or hands. This means stepping on top of logs and rocks and then down, turning over rocks and logs with a stick rather than with the hands, and exercising extreme care when picking berries, gathering firewood, or climbing ledges. Copperheads infest the "sinkholes" on our mountain ridges and occur in cave entrances, and both the Copperhead and the Massasauga will bite fingers which appear under the rock which shelters them. Our poisonous snakes almost never cross concrete roads but they may be found beside them or in the culverts beneath the roads.

Do not make pets of poisonous snakes. They are as dangerous for grown-ups as dynamite caps are for children, and seem to arouse the same desire to show-off. It is quite true that many dangerous snakes lose their quick tempers in captivity, but even "tame" rattlesnakes should not be handled by inexperienced persons. Most herpetologists have a healthy respect for poisonous snakes, which may explain why they often outlive amateur "snake-charmers." It is safer to use a hook or noose instead of bare hands when collecting poisonous snakes. For sometime after death a snake's jaws have the power of closing and of driving the fangs into the flesh, so the head should be held down with the foot and severed from the body prior to skinning. Persons with strong nerves may then pinch the tail and observe the manner in which the headless stump returns and sometimes hits the hand.

****

CONSIDER THESE FACTS ABOUT CONSERVATION

Thomas Liggett, a dean of Pennsylvania sportsmen, furnishes facts about conservation in the following article that deliver a crushing blow to arguments advanced for stream pollution. His article follows:

"Our stream polluters and destroyers of 'Wild Life' seem satisfied to excuse themselves on the basis of 'Commercial Necessity.'

"After the hearing in Harrisburg, March 17th, 1931, I determined to answer them in their own language, namely, Dollars and Cents.

"The Wolcott Senatorial Committee on 'Conservation of Wild Life Resources' says: 'Wild Life now has an accepted meaning embracing fish, mammals, birds, and the related association of fields, forests and streams.' While much has been destroyed, what is the value of what remains?

Sporting Firearms	$21,070,367.00	
Ammunition	43,779.020.00	
Total		$ 65,749,387.00
Fishing Manufacturers Association Report Fishing Tackle	$ 25,000,000.00	
Clothes, etc.,(conservatively)	25,000,000.00	
Total		$ 50,000,000.00
		$115,749,387.00

"THINK OF THE NUMBER OF PEOPLE WHO EARN THEIR LIVING IN THE MANUFACTURE OF THESE GOODS.

The 'Wolcott Committee' estimates the number of hunters and fishermen at 13,000,000 with a conservative annual expenditure of $50.00 each, or	$650,000,000.00

"THINK OF WHAT THIS REPRESENTS TO GUIDES AND OTHERS IN THE DISTRIBUTION OF THIS SUM.

The Biological Survey values the Meat taken per annum at		$150,000,000.00
The Department of Fisheries gives the annual catch of Commercial Fish (to the men who catch them)	$116,000,000.00	
By-products	$ 25,000,000.00	
	Total	$141,000,000.00
The Department of Agriculture reports the annual destruction of insects by insectivorous birds as worth to the farmer		$350,000,000.00
"These items amount to		$1,406,749,387.00

which, if capitalized at 5 per cent gives us $28,134,987,740.00 as the capital worth of what we have left, a greater sum of money than the United States spent in the World War.

"The insects which the birds do not destroy do an annual damage of $1,105,000,000.00. Where would we be without our insectivorous birds and how important it is that their number shall be increased?

"Federal and State Parks and Hatcheries, etc., represent a cost of $507,134,935.00.

"Much that has been destroyed can be recovered with help from the polluters. To help recover this and avoid further pollution, to increase our stock of insectivorous birds and greater care of so much of nature as has not been spoiled, are duties we owe to our Nation, our Children and Ourselves."

****

SCORES DOUBLE

"The Double Scorers' Club" in the bait casting fraternity has a new member, J. Audley Aug, of Irwin. While fishing with three friends in the Allegheny River, according to Warden R. C. Bailey, Aug hooked and landed two smallmouth bass on a plug simultaneously. One bass was 16 inches in length, the other 10 inches.

Aug and his party landed 18 nice smallmouth bass on their trip.

****

HOOKS BASS BY TAIL

Taking rank with some of the most unusual catches of fish reported this season is the landing of a 12-inch largemouth bass by G. F. Govern of Harrisburg. Govern was fishing in Hough's Pond, Wayne county, using as a lure a small plug.

When the plug struck the water near a lily pad pocket, a fish struck and immediately sounded in the deeper water off shore. Apparently well hooked, it moved swiftly away, and Govern promptly checked its run. After that, it came in with little resistance, although the drag on the line was so unusual as to cause the Harrisburg angler to wonder what he had hooked. When pulled toward the boat, the water had distended its gills causing the strange drag on the line.

Examination of the catch revealed that it had been hooked at a point about midway between the anal fin and the base of the tail.

****

"EEL RACK" PEACHES

When he inspected his eel wall in the Juniata River recently, George Bender, of Lewistown, saw the roots of a tree projecting above the surface of the water. When he pulled the tree from the water, he found it laden heavily with peaches, and picked a bushel of them.

It is believed that the recent high water had washed the tree, roots and all, into the river, where it found a resting place in the eel rack.

****

THE BELTED KINGFISHER - FEATHERED FISHING ACE

The strike of a belted kingfisher is all the evidence necessary to convict it as an ace of feathered enemies to fish in Pennsylvania streams. To the casual observer, the speed and accuracy of a kingfisher's plunge for prey is amazing. Like a feathered bolt, beak foremost, it darts at the water from its perch on a tree limb overhanging the stream, or, pausing in its somewhat erratic flight over the water, wings beating swiftly, makes its kill from midair. When alarmed and in flight, the kingfisher's chatter and brilliant plumage, without doubt, adds a touch of atmosphere to a fishing stream. Counter to this rather attractive feature, is the fact that it takes heavy toll of fish from the waters it frequents. Estimates have placed its daily fish kill at two times its own weight or more. It is not protected in Pennsylvania and may be killed at any time.

****

CONCERNING CARP

Owing to their size, carp are sometimes thought capable of eating other fish. Exemplary of this belief is a report submitted to Warden C. Joel Young of Fullerton.

Young received word from Easton to the effect that a carp had been observed in the Bushkill Creek with a twelve-inch trout in its mouth. The individual making the call wanted permission to shoot the carp. In short order, the impossibility of a carp eating trout was explained to him, and more important, the fact that carp live chiefly on vegetable matter found on the stream bottom was clarified.

Anglers who fish almost entirely for carp in Lehigh and Northampton counties, Young writes, report that they have never found small fish or fish spawn in the stomachs of carp when they cleaned them.

****

HERE AND THERE WITH OUR ANGLERS

While heavy rains on the eastern slope of the Alleghenies definitely upset bass fishing in most streams in eastern Pennsylvania, streams in the western part of the state, according to reports are low and clear. Prior to the heavy rainfall, good catches of bass and other game fish were general. High water indirectly may benefit fishing, however, as the stream beds are now clear of moss and grass that is bane to the fisherman.

A mammoth smallmouth bass was reported recently taken in Lake Wallenpaupack. The big fish, weighing dressed 6¼ pounds, was landed by George Rickard of Honesdale. It had been out of the water nine hours and conservative estimates place its weight at seven pounds or more. Wallenpaupack is also providing exceptional fishing for pike perch or wall-eyed pike and pickerel, in addition to splendid sport with yellow perch, sunfish, and bullhead catfish.

William Dembaugh, Pittsburgh, landed a wall-eyed pike in Conneaut Lake recently that tipped the scales at five pounds. Six smaller wall-eyes, weighing from 1½ to 3 pounds, were also taken by the Pittsburgh angler, according to Warden J. S. Cannon.

Do You Want Good Fishing?

—Obey the Law!

PENNSYLVANIA ANGLER

Photo by Hon. Leslie W. Seylar.

WATERSNAKE WITH BASS

PROPERTY OF THE
PENNA. STATE LIBRARY

VOL. 2
NO. 10

OFFICIAL PUBLICATION
BOARD OF FISH COMMISSIONERS

OCTOBER
1933

OFFICIAL STATE
PUBLICATION

PENNSYLVANIA ANGLER

OCTOBER, 1933
Vol. 2 No. 10

PUBLISHED MONTHLY
by the
Pennsylvania Board of Fish Commissioners

* * *

Five cents a copy ~ *50 cents a year*

* * *

ALEX P. SWEIGART, *Editor*
South Office Bldg., Harrisburg, Pa.

GEORGE GRAY, *Illustrator*

* * *

NOTE

Subscriptions to the PENNSYLVANIA ANGLER should be addressed to the Editor. Submit fee either by check or money order payable to the Commonwealth of Pennsylvania. Cash or stamps not acceptable.

PENNSYLVANIA ANGLER welcomes contributions and photos of catches from its readers. Proper credit will be given to contributors.

All contributions returned if accompanied by first class postage.

Want Good Fishing? OBEY THE LAW

COMMONWEALTH OF PENNSYLVANIA
BOARD OF FISH COMMISSIONERS

OLIVER M. DEIBLER
Commissioner of Fisheries

* * *

Members of Board

OLIVER M. DEIBLER, *Chairman*
Greensburg

JOHN HAMBERGER
Erie

M. A. RILEY
Ellwood City

DAN R. SCHNABEL
Johnstown

LESLIE W. SEYLAR
McConnellsburg

EDGAR W. NICHOLSON
Philadelphia

KENNETH A. REID
Connellsville

ROY SMULL
Mackeyville

H. R. STACKHOUSE
Secretary to Board

C. R. BULLER
Deputy Commissioner of Fisheries
Pleasant Mount

IMPORTANT—The Editor should be notified immediately of change in subscriber's addres

Permission to reprint will be granted
provided proper credit notice is given

PENNSYLVANIA ANGLER

OCTOBER, 1933

VOL. 2 No. 10

EDITORIAL

●

Tomorrow's Fishing

CONSERVATION'S goal, for every great cause must have a definite goal, is perpetuation of healthful outdoor sport for future generations in the United States. There can be no repetition of the slaughter and waste in wild life which marred conservation annals during the nineteenth century if this splendid objective is to be achieved. Haphazard methods of fish and game control have gone by the board in this modern era. To achieve results that will assure a continuation of the oldest sports in the history of mankind, every sportsman in Pennsylvania should do his part. Cooperation, with our great army of outdoorsmen pulling together, is a keynote that must be sounded. Boys, the sportsmen of tomorrow, must be given consideration in our efforts to better fishing in Pennsylvania. The conservation spirit is growing, and linked with the sportsman's creed, must prevail if tomorrow's fishing is to be better than that being had today.

One hundred years, in the history of the world, is a comparatively brief span of time. In the history of American conservation however, the last century marked the passing of an era of wasteful slaughter of fish and wild life, the dawning of a period in which the sportsman's creed gained dominance in fish and game control after the supply had ebbed to dangerously low levels, and careful building of that supply to the point that has been attained today. In Pennsylvania, the conservation program has forged steadily ahead, encountering stern opposition at times, crushing it, in its advance. It is my belief that the support of our fishermen and hunters has been the very backbone of this splendid movement to better their sport. Vital as it was to success in the past, that support and eternal vigilance must mark the next stages of our better fishing drive if we are to achieve our conservation goal.

OLIVER M. DEIBLER
COMMISSIONER OF FISHERIES

Comparison of fishing and hunting methods a century ago with those prevailing today presents a striking contrast. Then, of course, the supply appeared illimitable, and ideas that it would not remain in that status were open to scorn. The seine and spear were regarded as sensible implements for taking "a mess of fish." Wild pigeons, that darkened the sun by the immense numbers in their flight, were netted, wild turkeys trapped, and buffalo slaughtered and left to rot in the sun. A man's prowess as fisherman or gunner was measured by the size of his kill. There could be no limit to the supply of fish or game, and then, that supply ebbed to the vanishing point. Today, the seine and spear are illegal devices in Pennsylvania for the taking of fish, the bird net and traps are outlawed, and a growing spirit, the spirit of conservation typified by the red man, has supplanted the slaughter code. The size of a catch of fish or bag of game no longer marks a man's prowess as angler or hunter in the eyes of a true sportsman. He is judged on the merits of sportsmanship alone.

The handicap imposed on fish life in Pennsylvania waters today by modern industrialization of the Commonwealth may, to a certain extent, be overcome by our fishermen. We must realize that our pure water streams, streams capable of maintaining fish life, are necessarily limited in area. The number of fishermen is constantly growing, and to furnish good sport, any stream, warm water or trout, must be brought to the peak of its productiveness. Stocking alone cannot achieve this goal, but stocking, coupled with stream improvement by our anglers and good sportsmanship on their part, must benefit any stream to the utmost.

Boys, who tomorrow will be active members of the great army of licensed fishermen, have taken an active interest in the stream improvement drive this year. Not only have they erected dams and other improvement devices on streams in the vicinity in which they live, but, through killing watersnakes and other fish predators, they have shown a laudable inclination to assure betterment in the sport. I believe that this activity of Pennsylvania boy sportsmen will have vital bearing on conservation's future in the Keystone State.

Tomorrow's fishing is in the making. As we, the fishermen and the Fish Commission, mould this splendid sport today, the result will be in evidence tomorrow. The builder sportsmen, boys and men, who look not to today's heavy catches, but instead, to keen enjoyment on fishing waters for future generations must decide the issue.

We are deeply grateful to a number of Conservation Commissions, especially Michigan and Connecticut, for their helpful cooperation and advice in stream improvement, and particularly Edward R. Hewitt, of New York State, who has accomplished such outstanding results in the Neversink River which was at one time practically devoid of trout, and to Governor Pinchot, who is interested in every phase of fishing, especially in trout fishing and trout streams. Governor Pinchot asked me to visit this demonstration of Mr. Hewitt's on the Neversink River. After observing what can be readily accomplished without great expenditure, I felt that a big field was open in Pennsylvania. With the consent of the Board and the Governor, we were able to secure approximately a mile of water on Spring Creek which has an ideal environment for trout and is located in the geographic center of the state. Our experimental work was begun this spring and devices used in the improvement site on Spring Creek are illustrated in other parts of this issue of the ANGLER. We trust that fishermen and other conservationists of the state will visit this area the coming spring when our improvement work will be completed. While we believe that every stream is different and presents problems of its own, we feel that it will be practical for every angler to see just what may be done in stream improvement work through a visit to this site.

O. M. Deibler

UPPER LEFT INSET: THE SMALLMOUTH BASS; LOWER RIGHT INSET: THE DAPHNIA OR WATER FLEA (HIGHLY MAGNIFIED); CENTER: VIEW OF THE ALLEGHENY RIVER—IDEAL BASS WATER

THE BLACK BASS

THE smallmouth bass, peer of game fishes in Pennsylvania inland waters, was first introduced to streams in the Keystone State in 1863. In 1857, fifteen adult bass had been stocked in the Potomac River, then teeming with live food and ideal in every respect for rapid increase in number of these voracious fish. This original stocking, the earliest recorded in Atlantic seaboard states, was unique in plan. The bass were carried from the west in the water tank of a locomotive, and apparently suffered few if any injuries during their long journey.

Heralded by sportsmen as game fish superb, the fame of the Potomac's bass spread into other states. Six years later, a group of ardent anglers in the vicinity of Philadelphia, familiar with the game and table merits of the fish, raised a sum of $1,300 by public subscription to purchase bass for stocking. The fish, taken from the Potomac at Harper's Ferry, were released in the Delaware River at Easton and responded favorably to their new environment. An abundant food supply and ideal spawning conditions were available for Pennsylvania's first black bass, and ten years later they were plentiful in many sections of the Delaware. Encouraged by the success attending distribution of bass in the Delaware, sportsmen in southeastern Pennsylvania purchased more bass for stocking a few years later. These fish, distributed in the Susquehanna and Schuylkill Rivers, were also secured from the Potomac.

When, in 1873, the Board of Fish Commissioners, then known as the Board of Commissioners of Fisheries, decided to take bass from the Delaware for stocking other waters of Pennsylvania, a splendid supply was available. Under the distribution plan adopted, 2,044 mature bass were taken from the Delaware during the first year. Waters stocked with these fish were the Lehigh River, North Branch and West Branch of the Susquehanna River, Juniata River, Yellow Breeches Creek, Chiquesalonga Creek, Octoraro Creek, Pine Creek, and Codorus Creek. The second year's stocking program included Muncy Creek, Swatara Creek, Conestoga Creek, Mill Creek, Brandywine Creek, Pine Creek, Conroy Creek, Canton Creek, Buffalo Creek, Penn's Creek, Wissahickon Creek, Little Conewago Creek, Conodoguinet Creek, Marsh Creek, Big Conewago Creek, Big and Little Chiquesalonga Creeks, Susquehanna River, Allegheny River, and Saylors, Porter and Twelve Mile Lakes in Pike County. This widespread plan of distribution resulted in an increase of bass in practically all waters of Pennsylvania.

Almost without exception, when introduced, the black bass became abundant. The original planting was made with the hope that they would serve as an ideal substitute, from the game fish angle, for the brook trout, which, at that time, was rapidly disappearing from some of our streams. It soon became evident, however, that the stocking of black bass in smaller bodies of water, would develop into a costly experiment. So abundant did they become in waters offering inadequate range, that other favorite species of fish were threatened with extinction. In larger water areas, with their greater forage facilities, the bass was regarded as a fine addition to native species of fish.

Nature's regulation of balance in Pennsylvania's inland waters was vividly illustrated in the instance of the black bass. The tremendous food supply available for these voracious game fish when they were originally stocked was sufficient to carry an almost uninterrupted increase in number of bass during a period varying from 10 to 20 years. Eventually, however, the vast numbers of bass present in smaller waters resulted in a slaughter of other species. When the food supply dwindled, the cannibalism characteristic of bass and other game fishes asserted itself. Small bass necessarily re-

IN PENNSYLVANIA

placed the minnow as a source of forage, and so effective was nature's system of restoring natural balance, that within a few years the bass supply had dwindled to or below normal.

The following comments on the black bass, taken from the Biennial Report of the Commissioners of Fisheries for 1883-84 furnish a clear idea of the vast number of bass then present in Pennsylvania waters.

"While all will admit," the Commissioners said, "that the black bass is one of the most prolific, palatable and gamey of our fresh water fishes, the question has arisen and is being warmly discussed whether its introduction into the waters of eastern Pennsylvania has been a blessing or otherwise.

"Nearly everybody, but especially sportsmen, anticipated great results from their introduction. Anglers were especially delighted, while commercial fishermen, turning their eyes toward the Potomac, which was producing great quantities of bass, looked hopefully forward to the time when the streams of our own state would yield a like harvest. Anticipation ran high and it cannot be denied that it was fully warranted by the almost immediate increase in number and size of the newcomers.

"That those bright anticipations were ephemeral and that they were realized but for a very brief period needs not the saying. In some cases the bass were roundly denounced as nuisances and among the loudest and most vigorous complaints were from some who, only a little while before, had been their most zealous champions. The strangers were charged with not merely devouring other fish too weak to defend themselves against such powerful assailants, but when they had exhausted that source of food supply, with turning upon and devouring their own progeny; that ultimately they would have entire possession of the streams, and that, eventually failing to find the required supply of animal food, would themselves become extinct. In proof of the latter allegation, the gradual diminutions in the annual catches in the Potomac and Susquehanna were pointed to.

"Now, all this may be true, and it may not. The friends of the black bass while admitting their ravenous disposition, stoutly deny that the bass are indiscriminate exterminators of weaker fish, or that there is the slightest evidence of diminution in their numbers, save such as can be readily traced to the deadly fish basket and other illicit contrivances for catching and killing them.

"They insist that as far as the Susquehanna and Delaware are concerned, the minnows destroyed by the bass are those which depredate upon the spawn of the shad and the perch or wall-eyed pike. Moreover, they contend that if the rivers were depopulated of minnows, it would pay the State handsomely to hatch shad largely for the special purpose of supplying food for the bass.

"From this it will be seen that this fish may not be as black as it is painted. Stronger evidence than has yet been presented is wanted by the board before determining what course shall be pursued."

The era of seines, fish baskets, and other illegal devices was rapidly drawing to a close. Sportsmen in all sections of the state clamored against the ruthless slaughter of game fish and other species by commercial fishermen. Typical of the growing sentiment for terminating the destruction of fish life in Pennsylvania streams is the following interesting letter written in 1879 by an ardent sportsman living on the Susquehanna River. It constitutes a strong defense of the black bass.

"There is," he wrote, "a very decided increase of the native salmon, pike perch, or wall-eyed pike in this river. Last year hundreds were taken averaging a foot in length and about three-fourths of a pound in weight. This increase is accounted for by the fact that the bass destroyed the small fish that preyed upon the eggs of the pike. If the laws now on the statute books against fish baskets and nets are enforced, these fish, which grow to a weight of ten pounds, will naturally increase. Until that is done, there is no room for the hope that there ever will be a material improvement in the product. Last fall, at the dam below Sunbury, there was taken out in a single night by one of those infernal machines and seines, no less than fourteen hundred pounds of bass and salmon. In other parts of the main river, and in the Juniata, the average catch of each basket at night, when the water was about three feet above the ordinary height, was at least fifty young salmon, about twelve inches in length."

BASS AND BLUEGILLS FROM TWIN LAKES

Commenting on this drive against illegal devices, the Board continues in its report for 1883-1884:

"Another gentlemen reported to the board that he had seen two bushels of young bass taken from a single fish basket in one night. Another, that a man of his acquaintance fed five bushels of young bass to his hogs in less than a week.

"That whatever fall-off there was in the supply of black bass was due almost entirely to fish-baskets and other illegal devices for catching them, was soon abundantly demonstrated. By vigorous measures the Delaware River was cleared of all fish baskets and traps but such a laudable result did not follow similar efforts in the Susquehanna. Almost immediately, the catches in the former stream began sensibly to increase, and do to this day, while those of the latter water course are steadily declining."

The wave of popularity with fishermen that carried the black bass to undisputed favoritism as a game fish has continued unabated to the present time. Its surging, picturesque fight when hooked, and the savagery of its strike marked it as the ideal fish from the angler's viewpoint. The demand for bass and more bass became increasingly insistent with passage of the years. Not until 1914 was the Fish Commission able to announce definitely that a successful method had been found for the artificial propagation of this peer of game fishes. In its report for that year, the Board asserted that success had been achieved by permitting the parent fish to spawn naturally and by teaching the young bass to take food while in the ponds.

The daphnia, or water flea, a tiny form of crustacea, served as the essential link to successful propagation of the black bass. Efforts to raise bass in Pennsylvania have been confined chiefly to the smallmouth variety, which is particularly adapted to waters of the Commonwealth. During recent years, however, the largemouth bass, frequenter of more sluggish lakes, ponds and streams, has attracted enthusiastic support from the angling fraternity. Both species are now propagated at Pleasant Mount Hatchery, where the annual output of bass, ranging in size from four to seven inches, exceeds a quarter of a million.

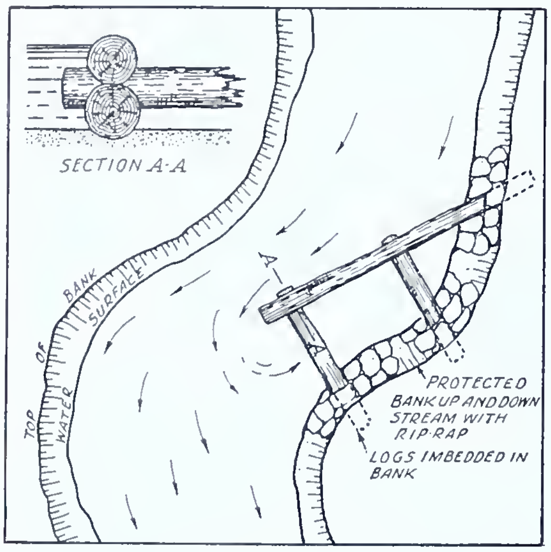
The bass stocking program of the Fish Commission has been a vital factor in the comeback of this splendid game fish. Hatchery methods and production of the food supply at Pleasant Mount Hatchery, where, at the peak of feeding the young bass, approximately two bushels of daphnia are consumed in a single day, will be the subject for November's feature article relative to the black bass in the Keystone State.

WALLENPAUPACK CATCHES

Three game fish, having a combined weight of 21 pounds, were caught recently in Lake Wallenpaupack by Jud J. Hill, of New Jersey. Hill, according to Warden John Schadt, Jr., landed two wall-eyed pike, one weighing 10 pounds, the other 6½ pounds, and a largemouth bass, weighing four and one-half pounds.

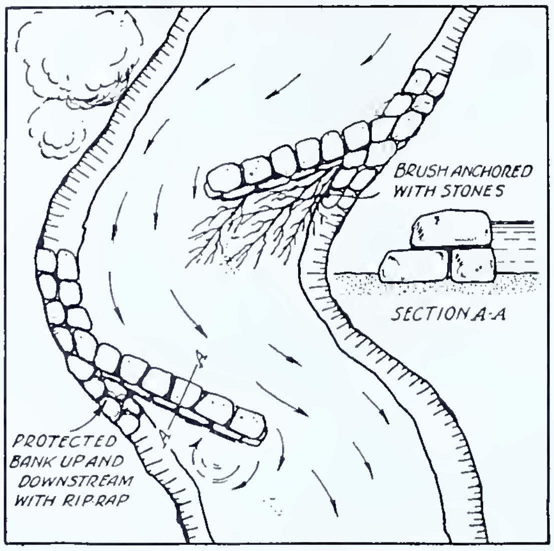
Walter Irwin, Harry Irwin, and Thomas Sturgers, of Reading, had a combined two days catch of 46 bass, ranging in weight from two and one-half to three and three-quarters pounds.

SUGGESTIONS FOR STREAM IMPROVEMENT



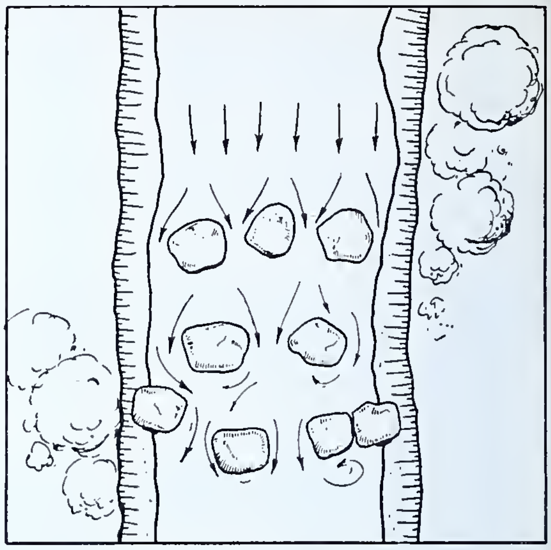
LOG DEFLECTORS

The type of deflector shown above can be built on many streams where there are not sufficient stones to build the stone wall type. These deflectors, by notching the joints, can be made very substantial and practical out of any old dead trees or fallen timber that can usually be found in proximity to most streams. This type is probably more widely used in the open areas and meadow lands where the current is not so swift and other material is scarce. When selecting a location for the deflector of either type, care should be taken that the current will be deflected at such an angle to the bank that there will be the proper place for the scouring of a hole or pool.


BRUSH ANCHORED WITH STONES
SECTION A-A
A
A
PROTECTED BANK UP AND DOWNSTREAM WITH RIP RAP

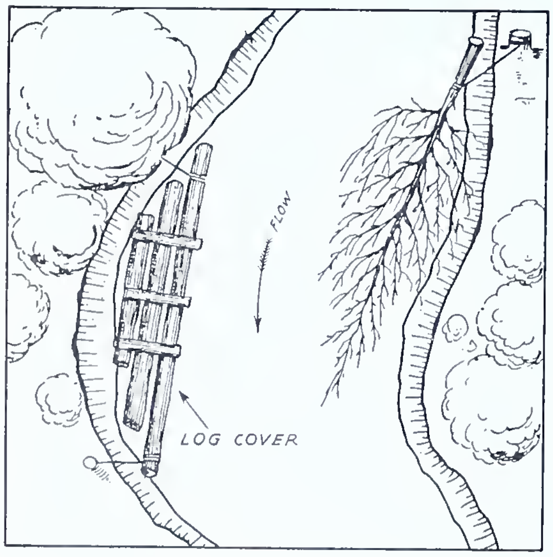
STONE WALL DEFLECTORS

Many of our Pennsylvania streams have long stretches of shallow riffles affording no shelter or hiding places for fish, and few if any fish are caught in these areas after the streams become low and clear. There are also equally as many long shallow pools, where there is little if any current, and where year after year more sediment is deposited so that these areas too afford very little fishing. The type of wall deflector shown above, if built in a substantial manner, will correct both of the above described conditions. On the shallow riffles the current will be confined and deep areas will be scoured out making pools and in the case of the shallow pools the current will be speeded up and the pool will be deepened.



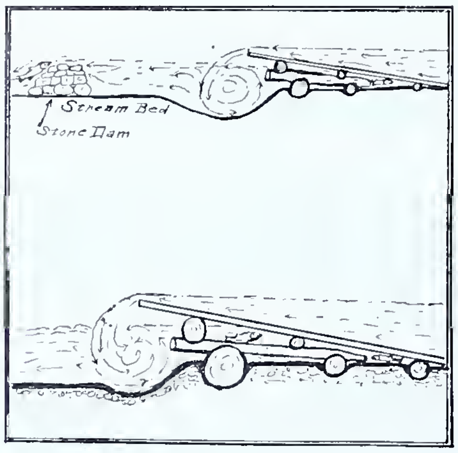
BOULDER RETARDS

Another method that has proven very practical in our experimental work on Spring Creek is illustrated in this drawing. In large areas where the current was rather slow and few deep pools, it was found practical to roll and drag into the stream large rock boulders, placing them so the whole current is confined to the narrow channels between these boulders. This has been found to speed up the current and also wash or scour out pools of considerable size and depth below these stones, also provides excellent shelter and makes fishing a little more difficult, which develops the accuracy of the fly caster. This is an improvement that can be made at practically no cost.



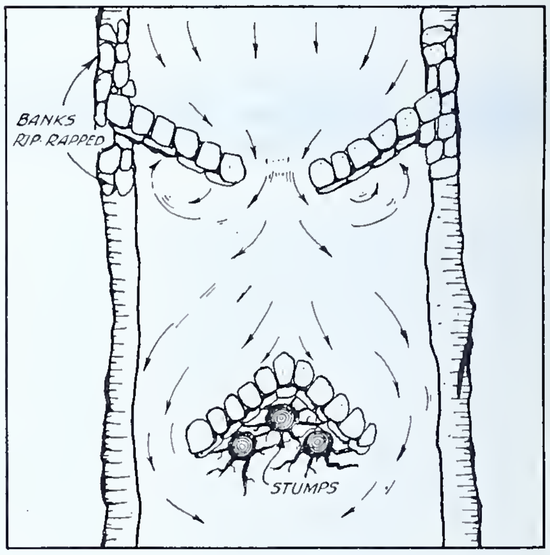
ANCHORED TREES

Thirty to forty years ago before the lumbering operations ceased in Pennsylvania, most of our streams had great quantities of old tree tops and huge piles of what was then called drift wood. This debris was usually lodged in some of the bends in the streams which deflected the current, scouring out a great pool to the side. Immediately below these piles of drift wood innumerable old tree tops were found, with all their branches, which helped our streams in these periods, but since our mountains have been deforested, our streams are subject to greater freshets than in those days. Many of our streams that were once famous trout streams are now practically denuded of any form whatever of vegetable matter. These can be helped very largely by following the method illustrated above by anchoring the old trees with their branches and bundles of limbs to the trees or stumps on the bank.



DAMS

The above cut illustrates a type of dam that can be easily built in a permanent manner. This type serves a two-fold purpose in that it creates two pools equally valuable. If the falls below the dam are too high for fish to migrate freely, a small stone dam or wall can be built below the falls to raise the water level below the dam, so that in no case will there be any difficulty for any of our fresh water species to migrate upstream. E. R. Hewitt, the designer of this type of dam, has achieved wonderful success with a number of them on the famous Neversink River in New York State. Care should be taken that the bottom logs are well and securely anchored in the stream bed, and then use sheeting boards at least eight feet long so the slope will be gentle and also reduce pressure from freshets, and provide wonderful protection in the space directly underneath.



THE "V" TYPE DEFLECTOR

This illustration shows a very practical type of stream improvement in areas where the stream has spread out and become very shallow and practically barren of fish. The only difficulty in adopting this type is that it requires more material than there is usually available in most of our streams, but in cases where proper amount of material can be had, this makes a very excellent type of improvement. By following the illustration, of planting old stumps and plenty of fine brush in the dead water areas immediately below these wings, it has proved that these areas produce a great quantity of fish food. In areas of this kind on Spring Creek in two weeks after the brush was planted, great schools of small minnows and other bait fish were seen to be taking up their residence in these protected places.

VERSUS THE WATERSNAKE

THE COVER PAGE

An argument is sometimes advanced that watersnakes, while admittedly outstanding enemies to slower moving fish such as the sucker, are not capable of catching black bass. In answer to this theory, the illustration on the cover page of this issue of the ANGLER, *should serve as sufficient evidence to build a case against the watersnake as a game fish destroyer.*

This unusual photo, contributed by Hon. Leslie W. Seylar, of McConnellsburg, member of the Board of Fish Commissioners was taken on Tom's Run, in Green County. The snake's victim in this instance was a black bass measuring 10½ inches in length.

A RELENTLESS campaign against the watersnake, advocated by the Fish Commission and waged in many sections of the state by sportsmen and Boy Scouts this year, is entirely justified from a conservation angle. Although this squat, drab reptile may not individually destroy as many fish during the summer months as the snapping turtle, which ranks as an arch enemy to fish life, the large number of watersnakes present in Pennsylvania waters cause these predators to loom as a major natural menace in the drive for better fishing.

Watersnakes emerge from hibernation in early spring, and until autumn, when they again enter a dormant state, prey heavily on fish, tadpoles, frogs, toads, and other life present in or near the water. They are capable of swallowing objects of much greater circumference than themselves, their elastic jaws spreading to accommodate the size of the prey that has been captured. Frequently, a snake on the alert for food will lie quietly on the bed of a stream, its coloration aiding in concealment. In effect, it may resemble a stick of wood. A fish swimming above it is struck swiftly, often on a pectoral fin or the tail fin. In its frantic efforts to escape the captor, the fish tires rapidly, and when an opportunity is presented, the snake secures a tailhold on some object near shore, dragging its victim from the water. So effective is this method of capturing prey, that a watersnake of moderate size may overcome a fairly large fish.

In taking fish, the watersnake may succeed in cutting off the escape of its quarry from beneath an overhanging bank or large rock. This habit is in part accountable for the large number of stone catfish taken by snakes in streams where they are plentiful. Suckers and minnows also constitute a large portion in its diet, while game fish, bass and pickerel, are occasionally taken. In streams where brook trout occur, the watersnake is highly destructive, and instances are on record at the Fish Commission of the killing of reptiles containing from six to eight trout, some of them above legal size.

Breeding time for the watersnake, which brings forth its young alive, is generally in late August or early September. Paul L. Swanson of Wesley, who has made a close study of the habits of reptiles native to Pennsylvania, reported having captured a watersnake, measuring 41 inches in length on August 15, last year. This snake on August 30 gave birth to forty young snakes. While forty young apparently is a large number from the standpoint of reproduction for an adult snake to bear, it is not unusual. Occasionally a watersnake may bring forth as many as sixty young, but the average ranges from twenty-five to thirty for a litter.

Young watersnakes are very active, almost immediately after birth. Apparently, the family instinct is strongly lacking in this species, for in a comparatively brief time, each young snake starts to forage for itself. Fortunately for fish conservation, the toll taken upon the young reptiles is exceedingly heavy. Harassed from the air by birds of many species, devoured readily on the ground by small mammals, such as mice, and preyed upon in the water by fish, few snakes from a litter attain maturity. This fact is probably to be held accountable for the high rate of reproduction of watersnakes.

Small calibre rifles are effective weapons in snake control. By habit, the snakes sun themselves on rocks, logs, and other surfaces exposed to the sun near the shoreline. Often they may be observed on bushes bordering the stream, and frequently, their heads slightly above the surface of the water, they swim about. The boldness that is characteristic of the watersnake in taking prey is amazing. A live net, containing fish, or a minnow trap holding bait fish, will often lure them to the attack. They have on occasion apparently small fear of man, and this lack of caution may be capitalized by sportsmen in killing them. Shooting snakes is first rate target practice for a gunner preparing for the hunting season.

The watersnake ranks as an outstanding enemy to frogs and tadpoles, which comprise a large part of its diet where they occur. An incident on a Pennsylvania trout stream early last season typifies the tenacity of this destructive reptile. While fishing for trout, a fisherman heard slight splashing in the stream a short distance above the point at which he was standing. The stream was high, running a swift current, and suddenly an object was swept into view. Closer inspection revealed it to be a large bullfrog, lungs distended and floating on the surface. Occasionally, despite the frog's efforts to keep its head above water level, it disappeared from view. As the current carried it by the fisherman, within a distance of five or six feet, he observed the brightly mottled body of a watersnake, its fangs embedded in a leg of the frog. Turning over and over beneath the surface of the water, the reptile was trying to pull the frog under. Even when the fisherman threw a stick at it, it refused to relinquish its grip, and in a few minutes the current had carried snake and victim beneath a dense clump of alder bushes overhanging the stream.

In streams recently stocked with trout, the watersnake is capable of playing havoc before the fish have become accustomed to their environment. Owing to their destructiveness, fishermen interested in trout fishing will definitely benefit this sport by thinning down the number of watersnakes on trout waters approved for stocking by the Fish Commission.

Pennsylvania inland waters, now subjected to heavy fishing by over a quarter of a million licensed fishermen are placed under an additional strain through the presence of thousands of watersnakes. Obviously, the thinning down of these reptiles will benefit the angler's sport on stream and lake. A timely slogan, "For Better Fishing, Kill the Watersnake," has been adopted for the campaign against these destroyers of fish life.

CONCERNING WATERSNAKES

Junior Conservationists and Boy Scouts had prominent roles in the Fish Commission's campaign against the watersnake this summer, reports indicate. Cooperating with the Fish Commission, which is offering medals to each Scout who kills ten or more watersnakes this year, the Pottstown Sportsmen's Club is offering to the scout troop in Pottstown killing the most snakes this year an official Scout bugle as an additional award, according to Edward S. Ibach, president.

"When is a watersnake a watersnake?" R. W. Hoxworth, assistant Scout Master and Scout Executive of Pottstown, asked recently. Two incidents that occurred in the snake-killing campaign prompted the question. After killing a watersnake, a Scout saw thirty young snakes run from it, and killed them all. Another Scout killed thirty-seven young snakes that had emerged from a large watersnake he had just killed. The question raised was 'Do the young snakes count in the total kill for these Scouts?' "

In answering the inquiry, Commissioner Deibler stressed the fact that mortality in young snakes is very heavy, in fact, only about one in ten lives to reach maturity. On this basis, the Scout killing thirty young snakes would be entitled to a count of four plus the old snake for his score, and the scout killing thirty-seven, five snakes and the old snake for a count.

LOG DAMS AT PLEASANT MOUNT

THE STREAM IMPROVEMENT PROGRAM

STREAM improvement in Pennsylvania during the past summer had three major phases. Sportsmen taking an active part in work of this type were central figures in the campaign for better fishing. The Fish Commission, in sponsoring stream improvement, carried through two other essential features of the program; first, increased facilities for fish production, and second, a practical demonstration of stream improvement at the recently acquired site on Spring Creek. Enthusiastic participation of fishermen in many parts of the state marked the stream betterment campaign and results of the first season's work are highly encouraging.

The general idea advanced in this program is that an ideal trout stream combines three vital factors, food abundance, proper water temperature, and good shelter. Lacking in any one of these essentials, the capacity of a stream to produce trout of maximum size and number is necessarily limited. Many forms of aquatic and insect life constitute the food supply of trout. The diet range extends from tiny aquatic organisms, clinging to vegetation, logs, or rocks on the stream bed, necessary food for trout just past the fry stage, to the crayfish and cold water species of minnows, food for larger trout. Insect life, which, of course, is only available to trout during a limited period of the years, constitutes an important factor in the forage classification. Food accidentally washed into a stream, for instance, the earthworm, also should be mentioned. To a major extent, the abundance of food supply in a stream hinges directly on the cover available, not only on the bed of the stream but in the presence of foliage along the shores. Water temperature, which should have a maximum range not exceeding 70 or 72 degrees in summer, is governed chiefly by shade on the main stream and its spring water tributaries, by the speed of the current, and the amount of low temperature water poured into the main stream by the feeders. By providing more abundant cover and speeding up the current, stream improvement devices automatically tend to increase the food supply available in trout water.

Pennsylvania trout streams are of many types. A brief checkup on seven of these types, while not, in any sense of the word, covering the entire range of stream conditions, has a general bearing on the field to be covered in the improvement drive. Uniform shallow streams and streams of uniform depth comprise the first group. Current deflectors, log or boulder, constructed at bends in the stream, with the idea of concentrating the force of the current on the bank on the left-hand shore, if the curve is to the right, and right-hand shore, if the bend is to the left, are effective devices for the first group. Current deflectors are also effective in improving streams that become dangerously warm in midsummer through increasing the speed of the current. Cover is also a consideration in this type of stream. Type three streams, having too many small trout, may be improved by installing current deflectors to increase available food-producing areas. Waters subject to fluctuation in flow, providing they are of low temperature, constitute type four streams, and may be improved by introducing well-constructed log or boulder dams.

A fast, narrow channel, created by the V-type of deflector, is ideal for improvement of type five streams which have become choked with sand or muck. Covers may also be used to advantage. Streams deficient in food for trout, type six, may be improved through construction of current deflectors, log and brush covers, and planting of trees and brush on the shores. Improvement of type seven streams will constitute a definite forward step to better fishing. These streams, and there are many of them, are subjected to heavy fishing in areas particularly suitable for trout, while long stretches of water, having few if any trout, are passed up by fishermen. Shelter and current deflectors are ideal improvements for poor fishing areas on any stream. In brief, the type of stream to be improved should determine the method to be followed and improvement devices to be used.

Increased production of trout at the hatcheries will have a direct bearing on the success of the stream improvement campaign. In meeting a constantly growing demand for more trout for stocking, the Fish Commission has expanded its production program this year. Two new trout farms, Huntsdale, in Cumberland county, and the Spring Creek site, have been developed. Huntsdale at the present time has over 60,000 trout, brook and brown, ranging in size from fingerling to adult, in its ponds for distribution to streams approved in the survey. Eighteen permanent retaining ponds have been constructed.

Spring Creek bids fair to become one of the outstanding trout-producing projects in the east. Thirty-two permanent retaining ponds are now completed at this site, which is located on Spring Creek, near Bellefonte, Centre County. At the present time, over 260,000 trout are being raised in these ponds and the rapidity of their growth is attributable in large part to an ideal water supply from a giant 3,000-gallon a minute spring. The first pond unit for this site, when completed, will have 64 permanent trout-raising ponds. This increased available supply of trout for stocking purposes will dovetail nicely into the stream improvement campaign with its assurance of increased carrying capacity for trout streams in Pennsylvania.

Practical stream improvement is a feature in the development of the Spring Creek site. At the upper tip of the project, a short distance below the point where Spring Creek enters the tract, a dam of the type advocated by Edward R. Hewitt, distinguished authority on stream improvement, has been constructed. This dam, with a ledge immediately below the breast to permit easy passage of fish and the ideal trout pool formed above the breast, adequately demonstrates the effectiveness of proper stream improvement. A short distance below the Hewitt dam, brush shelters and boulder retards have been placed in the stream. Spaced at intervals downstream are a number of large boulder wing deflectors, which have served to increase the current and to form ideal eddies and back water suitable as winter holes for trout. Directly opposite the Hewitt dam another winter hole has been excavated, and in the cover introduced thousands of minnows and other forage as well as young trout are to be observed.

At a point opposite the upper section of the trout raising ponds, other improvement devices have been installed. Log wing deflectors, V-deflectors and covers will be features in the development of this section of Spring Creek. At Spring Creek, improvement devices particularly adaptable to Pennsylvania trout waters will be displayed, and should serve as models for improvement projects to be undertaken by sportsmen on their favorite trout streams. Spring Creek is still in the first stage of its development but its adaptability as a demonstration project for stream improvement and the raising of trout for stocking purposes has already been established.

BOULDER DEFLECTORS AT SPRING CREEK

Low water during early summer tended to make stream improvement projects highly effective. With waters in most trout streams low during July, which ranks as a favorite month for improvement work, areas most in need of betterment were revealed. From another angle, the cold water in trout streams did not have such chilling effect on the workers during the heat of midsummer days. In urging stream improvement as an aid to better fishing, the Fish Commission advocated permanency in building improvement devices. One deflector or dam, carefully constructed, is worth a dozen or more devices built in haphazard fashion.

Recent high water will undoubtedly serve in making stream improvement projects completed this summer more effective, provided they have been constructed with the thought of permanency in mind. More water areas on improved streams, pools and eddies formed by improvement devices, will undoubtedly aid definitely in carrying over the winter trout stocked from the hatcheries this autumn.

V-DEFLECTOR, SPRING CREEK

DEFINES SPORTSMAN

There is no higher tribute that can be given a man than to say that he is a good sportsman.

Grantland Rice, the Homer of America's sporting world, says that "a good sportsman is one who plays the game according to the rules that govern that game."

NOT STRICTLY A FISH YARN

If there wasn't a kingfisher mixed up in this story, "fish" would fit right in. Draw your own conclusion. Warden M. E. Shoemaker, of Laceyville, tells a good one and backs it up.

One of those noisy belted kingfishers was perched in a willow overhanging the Tunkhannock Creek, famed for its bass and trout fishing. Directly beneath was a steel trap set for mink by Harold Wright, a farmer.

Over the pan of the trap swam a three-inch black bass. The kingfisher plunged, hit the bass, the bass hit the trap pan, and Mr. Wright found a dead kingfisher, black bass, but no mink when he made his trap rounds next day.

THE FISHERMAN

James Oliver Curwood once said: "The world loves a man who loves to fish. You don't find him in jail. You don't find him in the hospital. You don't find him dying young. He is the man, who without flaunting his religion from the housetops, sees God forever in the blue skies, in the forests, in the glimmer of the stars, and the rising of moon—in everything that is a part of his beloved streams and lakes. Fishing is not only a pastime which man has created for himself. It is the greatest character-building activity under the sun for hearts and souls. It is the man who loves fish who helps to keep the world at its best, who is the greatest fighter for its beauties, and its ideals, and all because he has come to realize and understand the glorious thrill of that contact with nature which one finds when he has the rod in hand."

RAISING BULLHEAD CATFISH AT THE HATCHERIES

By C. R. Buller
Deputy Commissioner of Fisheries

THE BULLHEAD

WIDESPREAD popularity of the bullhead catfish, not only as a fish affording splendid angling possibilities, but delicious food for the table as well, has caused it to rank in Pennsylvania as one of the most important fishes distributed by the Fish Commission. With a constant increase in the number of fishermen during recent years, it is evident that heavy stocking of bullheads is necessary to meet the demand. Last year, for instance, over 406,000 bullhead catfish ranging in size from two to ten inches were distributed to waters of the Commonwealth. Propagation of the bullhead is an important feature in the work of a number of our hatcheries.

At Pleasant Mount hatchery, the brood fish are kept in ponds having natural dirt sides and bottom. Because the eggs extrude in one mass, the artificial taking of the egg is not successful, but fortunately for the fish culturist, this is not necessary. When the parent fish are allowed to spawn in their natural way, the fertilization of the egg is almost one hundred per cent. This, no doubt, is due to the nest construction as the spawning takes place away from outside influences, such as water current, other fish, and other factors. Hence at the hatcheries, the brood fish are permitted to deposit their eggs in the nest in their own way.

During the nest building, the fish frequently injure their fins in loosening the dirt. This injury many times becomes infected, resulting in death of the breeders. To eliminate this, artificial nests are placed in the brood ponds. The artificial nests are made of nail kegs, barrels, or tile. They are placed on their side, submerged in a shallow depth of water along the bank and partly covered with earth, one end of the nest being entirely closed and the end facing the center of the pond partly closed, the opening being left large enough for the free passage of the fish. Inside of the artificial nest several inches of earth are placed. These ready built homes look attractive to the more or less lazy bullhead and are used in preference to one of their own construction, thus eliminating to a large extent, the loss caused by injury.

The fish culturist, being familiar with the maternal instincts of the catfish and their success in caring for their own eggs and young, where conditions permit, leaves the parent fish to do the work. It might be stated here that while the catfish take wonderful care of their brood of young ones, when these little fish start out for themselves, the parents and other catfish will not hestitate to feed upon them. This necessitates removing the little catfish from the brood pond, and placing them out of harm's way in the nursery ponds.

When the little fish become large enough for the parent to bring them from the nest, the school is quietly approached in a rowboat and a large dipnet gently placed under the mass of little fish. By this time they have become thoroughly frightened and try to settle to the bottom, but instead settle into the net and are lifted from the pond and transferred to ponds especially constructed for raising the baby bullhead.

In some cases, it is not practical to let the parent fish care for the eggs. For example at Pleasant Mount, a portion of the brood stock are kept in ponds, each covering several hundred acres. The water in these ponds cannot be kept at a constant level. Many times the catfish nests are in the shallow water and before the period of incubation is complete will be left high and dry on the shores, owing to the receding water. After the spring rain, the holes or nests are carefully marked and after the eggs are deposited therein, attendants reach in the holes and remove the eggs, taking them to the hatching house where they are hatched artificially on a battery, as termed by the fish culturist.

A battery consists of a number of parallel troughs placed one above the other, with a space between of about five inches. Each trough is fourteen inches wide and fourteen inches deep. The length of each trough and number of troughs high, depends upon the number of hatching jars to be used.

At Pleasant Mount, each battery is six troughs high and thirty feet long, with a capacity of four hundred jars. While in use a constant flow of water, having natural temperature, is kept moving through the troughs, the water intake being at one end of the top trough. The current flows from one to the other until the bottom trough is reached. From this point the water is conducted in pipes to the fish storage tanks. About every twelve inches in the series of troughs, a one-half inch spigot is placed, below each spigot and resting on the next lower trough, is a small shelf. On this shelf under each spigot, the glass hatching jar is placed.

The hatching jar is a cylindrical glass jar, fourteen inches high and six inches in diameter. The bottom of the jar is rounded in such a manner that the water striking the center of the bottom, will distribute the upward current of water equally in all directions.

At the top, the jar is provided with a small snout which, when the jar is in operation, extends well into the trough next lower down from the one the spigot is in, acting as an overflow.

About six bunches of eggs are placed in each jar. The hatching jar is then set in its position on the shelf, directly under the spigot. A cylindrical one-half inch glass tube is then inserted in the jar with one end nearly touching the center of the bottom of the jar and the other end attached, by means of a short length of rubber tubing, to the spigot. The water is then turned on with sufficient pressure to give each ball of eggs a slight rolling motion. This rolling motion is caused by the upward current of the water in the hatching jar.

Catfish eggs require the least care, during the period of incubation on the battery, of any eggs hatched in a similar manner, by the Board of Fish Commissioners. Really, the only attention they require, is to see that the water pressure is adjusted properly at all times. Most all other little fish, when hatched in the glass jars, follow the upward current of water out the snout of the jar, hence into the storage tanks. But not so with the baby catfish. They cling to the bottom of the hatching jars and are left there until the yolk bag is very nearly absorbed, and their color changed to dark brown. At this time they are placed in the nursery ponds to grow.

The nursery ponds for the baby catfish are of various sizes, having natural dirt

(Continued on Page 13)

YOUNG SMALLMOUTH BASS

THIS TYPE OF FISHING AREA IS NEEDED IN PENNSYLVANIA

MORE WATERS IN WHICH TO FISH

By Kenneth A. Reid

Member, Board of Fish Commissioners

MANY and varied reasons are advanced to account for the unfavorable comparison between fishing as it exists today and as it was during the boyhood days of our grandfathers. Lack of vermin control, droughts, and overfishing are among the reasons frequently advanced and stoutly supported. All of these are doubtless contributing factors to a greater or lesser degree, but the one basic factor in Pennsylvania and other thickly settled Eastern states is the unfavorable ratio existing between the available fishing water and the number of fishermen. On one side of the picture we have had a serious reduction in the mileage or acreage of fishing water, largely through the agencies of pollution, while on the other side, we have had a remarkable increase in the number of fishermen. There could be only one possible result from such a combination of circumstances: fewer fish per fisherman per day.

What is to be done about it? Stocking in itself is by no means the complete answer. Fish cost a definite amount of money to raise and plant in the waters of the Commonwealth, and the number that can be raised and planted by the Board is limited by the revenue received from fishing licenses. The number of fish now being planted cannot be materially increased without a corresponding increase in either the number of licenses or the net amount of each.

Several other suggestions present themselves. First, too many fishermen? Perhaps so, depending on the viewpoint, but quite obviously we cannot reduce the number of fishermen, nor do we want to cut down their ranks. Second, increase the mileage of pure, and therefore fishing water, by eliminating much needless pollution? Highly desirable from every viewpoint, but unfortunately legislative action is necessary for its accomplishment, and that action has not been forthcoming, although every session is urgently requested to take the much needed action. Third, revise the Fish Code by reducing daily and seasonal creel limits, increasing certain size limits, providing sanctuaries and breeding grounds, and other intelligent conservation measures to bring the Fish Code abreast of present day conditions? Again, obviously desirable and necessary, but again unfortunately requiring legislative action. At the last session, such needed measures were embodied in the composite code bill, H. R. 1567, which was endorsed and actively supported by the Board and by the Pennsylvania Federation of Sportsmen's Clubs, in whose deliberations every sportsman's club in the state was invited to participate. Ignoring entirely the great body of sportsmen, the Legislature, and particularly the Senate, amended and reamended this bill until it was shorn of every worth while measure, and then inserted a vicious amendment that would have wiped out the bulk of the license revenue, so that the Board and the sportsmen were obliged to defeat their own bill in its final badly mutilated form.

These two things are fundamental to the future of fishing in Pennsylvania. We cannot catch fish from vilely polluted waters, and we cannot continue to permit the antiquated creel limits and other regulations designed to suit conditions more than a quarter of a century ago when there was not one fisherman for every twenty encountered today, if we are to have improved fishing. The responsibility for the accomplishment or the failure of these much needed measures is squarely up to the sportsmen themselves, both as groups and as individuals.

What can we do in the meantime? Assuredly, there is much to be done that fortunately does not require legislative action. Considering the mileage of fishing water that we now have, we can do much to increase its productiveness—its carrying capacity for fish—by stream improvement. The Board and many sportsmen's organizations have been quite active along this line, but the work is only in its infancy. Many of our trout streams have long stretches of flat, shallow riffles that afford not a vestige of hiding for fish, and are consequently barren. These stretches can be made to hold good fish by the installation of proper improvements—low dams, current deflectors, cover, and other devices. I am convinced that the average trout stream in Pennsylvania could carry twice the number of fish that it is now capable of doing if properly improved.

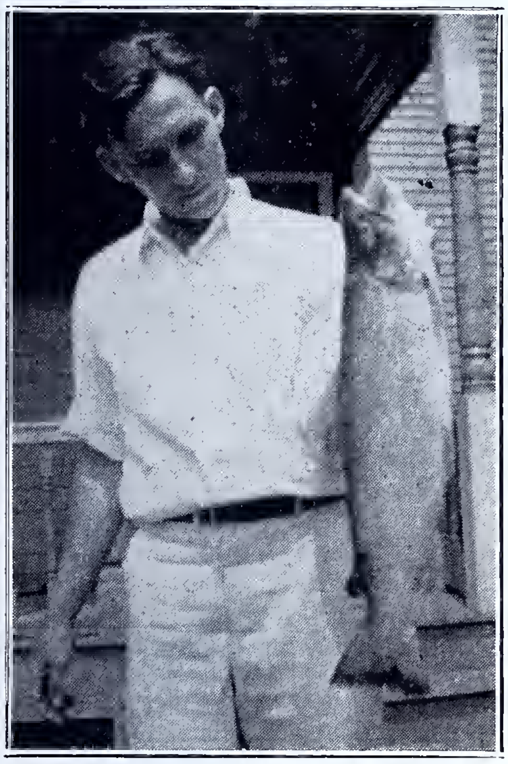
Stream improvement requires some money—a scarce article these days. Fortunately, stream improvement has been approved bv the Federal Government as a proper work of the Civilian Conservation Camps, and your Board has prepared concise instructions to aid them in doing this work properly. The completion of this work should mean much to Pennsylvania trout streams—and to a more limited extent to some of our bass streams.

While stream improvement will definitely increase the number of fish that a stream will support per mile, it will not do a great deal to reduce the congested fishing conditions on our streams. We need additional fishing water. In the northeastern counties, and to a lesser extent in the northwest, the natural lakes north of the line of the glacial drift provide much lake and pond fishing that the rest of the state does not have, except for the occasional artificial reservoir that is open to public fishing. The building of artificial lakes for fishing only, while highly desirable from the fisherman's standpoint, is entirely too expensive to consider at present.

But there is another way to attain the same result. The building of the modern highway through the broken terrain that is characteristic of much of Pennsylvania is a succession of deep cuts and fills. Many of these fills are across little rivulets that contain no fish, but whose valley above opens out in quite a basin. The location of the culvert at the proper height on the fill, instead of at the bottom, would often back up from five to fifty or more acres of water. There would be no expense to the dam itself, for it is an essential part of highway construction, and it would cost little more to locate the culvert ten or fifteen feet up than at the bottom. The face of the fill should in many cases be rip-rapped with stone along the water line at least, to take care of wave action. On small bodies of a few acres, this would not often be necessary.

Of course, flowage rights would have to be secured, and they could not be secured at every suitable place without purchase. But n most cases, I believe the farmer landowner would be glad to grant the flowage rights because a reservoir of this type on his property, even with public fishing rights guaranteed, would increase the value of his property, give him additional facilities for watering his stock, and provide recreational facilities for himself and his family that did not exist before. It might be quite in order to include in any such agreement an exclusive franchise to the landowner for any boats that might be rented on the water. This would in many cases furnish a very welcome source of revenue that would compensate for the granting of flowage rights free.

In the building of roads through our State Forests and State Game Lands, such a program would be greatly simplified of accomplishment, and these roads might well be surveyed with such a purpose definitely in mind, rather than merely as an incidental afterthought, for the addition of a number of these little lakes would add greatly to the recreational facilities and attractiveness of these lands.



BROWN TROUT, WEIGHT 6¼ LBS. TAKEN ON NO. 8 FLY IN UPPER DELAWARE RIVER

Very often across deep ravines, steel or concrete bridges are used. In many of these cases, a fill might be even less expensive than the bridge, and some of these fills would back up quite large bodies of water. In the case of existing fills on completed roads, they could be utilized by building a semicircular concrete apron in front of the culvert with its wings extending into the fill on either side, to any desired height, and letting the water spill over this and down under the fill through the original culvert. Where old bridges must be replaced, it would generally be less expensive to replace with a fill-dam than with a new bridge.

A still further, and tremendous possibility for dams of this type is presented by railroad fills. This would however, be more difficult of accomplishment for it would involve dealing with private interests on both sides.

Of course it would not be desirable to enter indiscriminately on a program of this sort. Large dams on most of our trout streams would prove undesirable. But there are hundreds of suitable locations where the fill crosses a little rivulet where there is no fishing at all under present conditions. Dams on these would create purely additional fishing, and would in no way interfere with existing fishing.

The Federal Government has recognized the possibilities of these highway dams and has instructed the Federal Highway Department to cooperate where requested by local agencies who will secure the flowage rights and pay any additional cost that may be necessary, such as rip-rapping the face and spillway. If our own State Highway Department will cooperate in the same way and permit a qualified representative of the Board of Fish Commissioners to go over the surveys for new roads to select and arrange for proper sites, we can have thousands of acres of additional fishing water in Pennsylvania.

Such dams would mean more than additional fishing. They would beautify the landscape along our highways and do much to raise the receding underground water table. They would prove a distinct asset to the state and its citizens, whether they happened to be fishermen or not. Such a plan has been started successfully in some of the prairie states, and it seems entirely feasible for Pennsylvania. These dams would in most cases be suitable for warm water fishes such as crappie, blue gills, catfish and yellow perch.

Kinney Pond or Tuscarora Lake in Susquehanna county has been providing exceptional fishing for pickerel and catfish this year. A number of pickerel exceeding 20 inches in length have been taken.

TIOGA COUNTY BASS WATERS

From Horace P. Boyden, fish warden at Wellsboro, comes word that Pine Creek holds real promise as a bass fisherman's pet. Rising in Potter County, Pine Creek flows along the Roosevelt Highway for a distance of thirty miles, turns into Tiadighton Gorge and in 16 miles of State forest is untouched by road. At places in the Gorge the walls are so steep that even a deer is unable to scale it. Since the closing down of tanneries, writes Warden Boyden, the fishing has steadily improved. Many anglers fish the stream from Ansonia where a fine public camp is maintained by the Department of Forests and Waters.

"Recently I saw a photograph of twenty bass that weighed over thirty pounds," Boyden writes. "They were taken by two of our local anglers. These bass were taken within four miles of the Roosevelt Highway in Pine Creek. There are also some fine brown trout to be taken by fishermen who don't mind a hike along the railroad which runs parallel to the stream. It has been necessary to make some arrests for violations of the fish laws along this stream but the number is not large in comparison to the large number of fishermen who enjoy the sport."

THREE ANGLERS MADE THIS CATCH OF BLUEGILLS AND PERCH IN MOUNTAIN LAKE, CUMBERLAND COUNTY

ARTIFICIAL WATER AREAS PROVIDING GOOD FISHING

Safe Harbor dam on the Susquehanna River, which was completed several years ago, is according to recent reports, providing excellent fishing for anglers in southeastern counties this year. Good catches of bass and other popular species, such as the catfish and sunfish have been numerous. Heavy stocking of this dam, as well as others recently completed has been an important factor in development of this fishing. Safe Harbor dam covers approximately ten and one-half square miles.

Another dam recently completed, that of the Evitts Creek Water Company in Bedford County, is approximately two and one-half miles in length. Located just above Lake Gordon, famous as the outstanding water for largemouth bass in Pennsylvania, this recent project this season has been providing splendid fishing, particularly fishing for the yellow perch. Lake Gordon has yielded a number of bass weighing over five pounds this year.

Work is being pushed rapidly ahead on the giant Pymatuning reservoir in northwestern Pennsylvania. When flooded the area covered will comprise the largest inland body of water in Pennsylvania, having eleven times the volume of Conneaut Lake. Pymatuning Lake will have a shore line of seventy-miles, extending in Ohio. Ashokan Dam, the source of water supply for New York City has a shoreline of forty miles, Chautauqua Lake, New York, thirty-nine miles, and Conneaut Lake, Pennsylvania, seven miles.

There is no size limit on sunfish, catfish, yellow perch, suckers, or fall-fish.

CONSERVATION TOPICS

VALUE OF SHELTER ON TROUT WATERS STRESSED

In an interesting letter to Commissioner Deibler, Royden J. Taylor, ardent sportsman of Indiana, Penna., stresses the necessity of shelter on trout waters in Pennsylvania. He also advocates cutting the creel limit on trout, and backs his stand by personal experience gained while fishing. Following is his letter, which was written just prior to the close of the trout season:

"Last Tuesday I fished Curry Run in Clearfield County and I am sorry to say the flow in this stream is almost gone. There was not enough water to permit a five-inch trout to move up and down the stream. We could not find a single trout on three miles of water. Of course they may have been hiding in some of the deeper pools, but they are there to stay until we get some real rain. This is a splendid stream and the flow has been coming back each year. However, the timber along the ridges has not yet sufficient growth to hold a lot of ground water throughout the dry summers. The last engine came down the log railroad in 1915.

"I was much interested in your article on shelter in trout streams in the last ANGLER. Thinking over the matter I realized that on streams where I have found the best fishing this year there is a lot of shelter where it is impossible for the fly man to fish and some of it the worm fisher could not negotiate, with any success. Notable among such streams are Lyman Run, Cook's Run and Young Woman's Creek. There is excellent fishing on these streams and there are also long stretches where it is useless to try to fish. Which proves that shelter does provide good fishing. Another instance is Clear Shade Creek above Ogletown in Somerset County. There is a long stretch of this stream where the tangle of brush is so thick that I doubt if even a three foot rod would be effective. From the number of small trout in the feeders above, this part of the stream must contain a lot of trout, perfectly safe from the anglers. These trout, of course, wander down stream and provide some excellent fishing. The filling station at Ogletown has a trout over twenty inches long wandering about a spring pool alongside the road. It was taken from this stream and I know of two others, over twenty inches, taken there this year. Shelter provides this kind of fishing.

"Now it is claimed that Wycoff Run is fished out, and if you will remember, there is very little natural shelter on this stream. Practically every foot of it can be fished, and easily. I had the matter of shelter and temperature rather forcibly thrust upon me last month. During a hunting trip last fall on Mix Run I saw some fine trout and was told by Walter Moats that the stream contained a lot of big brook trout. During a hot spell last month I went up there to fish. Moats said to start right in at his house. We fished several miles of this stream and not a fish. The water felt warm to the hand. The lower part of Mix Run is very wide and open and the sun had warmed the water so that the trout had retreated up to the head of the stream and up Red Run where the brush and rhododendron overgrows the water and it is cool. We did not have time to go up the seven or eight miles where they undoubtedly were, but if there had been shelter on the lower reaches the water temperature would have been low enough to hold the trout there. In this case the lack of shelter had more to do with temperature than protection to the trout. Fortunately they can move up and down this stream through about ten miles and get shelter and cool water when they want it."

STOCKING BROOK TROUT

The need for further creel limit cuts for trout is urged by Mr. Taylor as an additional aid to better fishing. Expressing his views on the present limit, he writes:

"Hewitt says six trout per day is enough for any man. This may be a little low for the one or two day fisherman, but if he takes a dozen, or fifteen, he has all that any one, except a hog, can use. This year, on Lyman Run, I saw a man take and cook more trout than two men could eat. He finally stuck and had to throw away about a dozen nice trout. There was nothing I could do because he was within his legal rights, and yet it hit me pretty hard to see this waste, knowing the cost and trouble necessary to put these trout in the stream. And yet he is one who growls because the fishing is not so good as it used to be. He was unable to understand how I could catch forty or fifty legal sized trout in one day and come home with only six in my creel.

"I hope to get one or two days this week up on Young Woman's Creek to wind up the season. There are two fish up there that were too smart for me last time, and they may be yet. If I can get them to just rise I don't care whether I hook them or not. My dad taught me that the joy of fishing was the day on the stream with a few bites; the taking of the fish is incidental."

A cut pole, two-cent line, and garden worm for bait captured the largest smallmouth bass entered in a Forest City fishing contest for Frank Antinatis, 11 years old. Frank's bass, weighing 3½ pounds, was taken in Cotrell Pond, reports Warden Joseph Podboy.

GAR-PIKE DECREASING IN PRESQUE ISLE BAY

A decrease in number of voracious gar-pike, dogfish and carp in Presque Isle Bay, Lake Erie, was noted in June, according to W. L. Weber, of Erie. Rock bass, smallmouth black bass, and wall-eyed pike were taken in increasing numbers this year, and size averages, with the exception of rock bass, ran larger than usual.

"Presque Isle waters are cleaning up," he wrote, "and increasing catches of smallmouth black bass have proved this, as well as a decrease in the number of dogfish, gar-pike, and carp, although it is a bit early to confirm the last statement as the water is not at its maximum warmth as yet. Good catches of rock bass, smallmouth bass, white bass and yellow pike have been reported along the lake shore east of Erie, and the rock bar bottom which is generously draped with wreckage, submerged and partly afloat, proves to harbor many of these popular species. The activity of Fish Protectors and deputies has decreased the number of poachers and seiners in local waters, and when one thinks of the scope of duties of these men and the territory they must cover, they must be commended in keeping down all types of illegal fishing."

Seth Says

Reckon there's no better way to help fishin' for speckled trout than to cut a lot of brush and throw it in a run. The thicker the cover, the better fishin' it'll make. Now, take down on the old Williams place, for instance. There was a sawmill settin' in there about six years ago, cuttin' out some good second growth oak and hickory. After the prime timber was cut, the mill was moved, and I jest happened to be down that way in late August. The run was low, and I seen some fair-sized trout in the pools. Must hev worked up from the meadows to colder water. Anyway, I tossed a lot of cut brush, limbs of trees and young timber that was layin' around into the run. Fer a space of mebbe a quarter-mile, there wasn't hardly room enough to work a worm into the creek. This year you'll see a great bunch of young trout in them pools and some big fellers to boot. You'd be surprised, I reckon, at how much it's bettered fishin' in the run. Trout has plenty of enemies, fer instance, mink, kingfishers, and herons. If they've got the right cover in a run, their chances at comin' through the winter in good shape is much better.

Spawning time for the brook trout comes in Pennsylvania in late October or November.

Raising Bullhead Catfish

(Continued from Page 8)

bottoms, and where conditions permit, natural dirt sides. Around the edges of the ponds, a dirt shelf is constructed, having a shallow depth of water, while the pond proper will have a depth of from two and one-half to six feet. The shelves are a favorite place for the little fish to congregate in the heat of the day. As evening approaches, they seek the deeper water. The ponds are kept well supplied with a healthy growth of aquatic plant life. Old stumps, logs, and cover, are submerged in the ponds. In fact, conditions are made as nearly natural as possible. The fish culturist realizes that much will depend upon the contentment of the little fish. If they are confined in a pond barren of all things natural to them, they will be constantly on the move, apparently searching for the places they desire. This uneasiness is not favorable to rapid healthy growth nor can they be induced where conditions are not natural, to consume food sufficient for their well being.

These little fish, if contented, are hearty eaters, each day consuming large quantities of food, which consists of clabbered cow's milk and finely crushed sheep liver. They are fed all the food they will consume. The food is placed in the ponds at a number of different places and left to settle to the bottom. The baby fish soon learn where the feeding places are and when hungry come to these spots in the pond.

They are fed two or three times a day. If too large a quantity of food is placed in the pond at one time, it will spoil before it is eaten. After the little fish have reached an age of several months, their food consists of the ground liver, light, and heart of the sheep. The same food is also fed to the adult bullhead, but the adult fish is fed but once a day.

By October or November, these fish have attained an average growth of three inches. They are then removed from the nursery ponds, carefully counted in the storage tanks in the hatchery building, and sent out for stocking the suitable waters in Pennsylvania. Owing to the large amount of pond area required at the hatcheries for the propagation of the different kinds of fish, it is necessary to ship the catfish before the ponds freeze over in the fall.

A certain number of ponds are allotted to the catfish work and as elsewhere stated, conditions in each pond must be made natural. Hence, if the fish were retained in the nursery ponds until spring, or until they were very nearly one year old, the drawing down of the ponds, for the purpose of removing the fish, would greatly interfere with the healthy growth of aquatic plant life for the entire season. As a result, when new broods were introduced, conditions would not be favorable for them.

Pike perch eggs measure about 110,000 to the quart.

George James, fish warden at Carlisle, reports that one day he observed a bittern catch 14 trout in a short time.

IMPORTANT NOTICE

Now that the PENNSYLVANIA ANGLER is issued as a printed and illustrated magazine, State requirements necessitate a subscription price of $0.50 a year in advance. Consequently, to make sure you do not miss any issues, it will be necessary to forward your subscription at once. As the number of copies printed of each issue is strictly limited to present needs, it will ordinarily not be possible to supply back numbers.

Angler Notes

Recent stocking of Pomeroy's dam on Tuscarora creek with yellow perch is showing results, according to Warden C. V. Long of East Waterford. A number of perch have been taken this season.

Anadromous fish are species common to salt water that run up fresh water rivers to spawn. Shad and striped bass are typical of this class.

A twelve-pound muskie was caught in Conneaut Lake recently by Ed Trunk of Clarion. Harry Wheeler of Oil City caught five smallmouth bass, the largest measuring 21 inches and weighing five pounds ten ounces.

All game fish, and this classification includes every species of fresh water fish common to Pennsylvania waters except bait fish such as minnows and stone catfish, must be immediately returned to the water from which they were taken if caught in an eel rack. A heavy fine is imposed as a penalty for taking fish in an eel rack.

Week-end fishing trips on the North Branch of the Susquehanna river are a habit with Charles Walderorf, Kingston angler. In high water recently, his Saturday afternoon catch near Laceyville was ten nice smallmouth bass. Helgramites were used as bait.

The term bait-fish, as applied in Pennsylvania Fish Laws, means all forms of minnows except fall-fish and all forms of killifishes and stone catfish.

Use of special devices, such as the outline, spear or gig, dip-net, or seine, for which permits were once issued, is now absolutely prohibited. A dip-net, to be used in taking bait fish, must not be more than four feet square, or exceed four feet in diameter.

Use of lights in taking frogs is unlawful.

Unnaturalized foreign-born residents are absolutely prohibited from fishing in any manner.

Fish Facts

Brown trout reach sexual maturity at approximately 34 months, and attain a much larger size than brook trout.

Under identical conditions, brown trout eggs hatch in the same period of time as that required for hatching brook trout eggs.

The fry of the brown trout live on the yolk sac for the same period of time as do brook trout fry under similar conditions.

Smallmouth bass are at home in our larger streams and rivers, while largemouth bass seek more sluggish waters such as ponds, lakes and slow moving streams.

When living under the same conditions, smallmouth and largemouth bass spawn at the same time of the year, usually late May or early June in Pennsylvania.

The male parent of the bass prepares the nest and cares for the eggs and very young fish.

Other names for the pike-perch are yellow bass, yellow pike, Susquehanna salmon, and wall-eyed pike.

Sexual maturity for the brook trout is attained at 22 months.

Brook trout produce from 400 to 2000 eggs, depending upon the size of the spawner.

Water temperature determines the time required for hatching brook trout eggs, which usually ranges from 45 to 95 days.

Baby brook trout live upon the umbilical or food sac attached to each little fish for from 15 to 40 days, depending upon the water temperature.

It is unlawful to sell any species of game fish.

The season for terrapin or red-leg opens in Pennsylvania on November 2 and closes March 14, both dates inclusive.

The placing of any obstruction in a stream which blocks the free migration of fish is prohibited.

The season for lake trout or salmon trout extends July 1 to September 29, both dates inclusive. Twenty-five may be taken in one day and there is no size limit set.

Trout, brook, brown, or rainbow, must be six inches in length to be legally taken.

The brown trout was first introduced from Europe in 1883.

Brook trout are native to Pennsylvania.

THE STREAM SURVEY

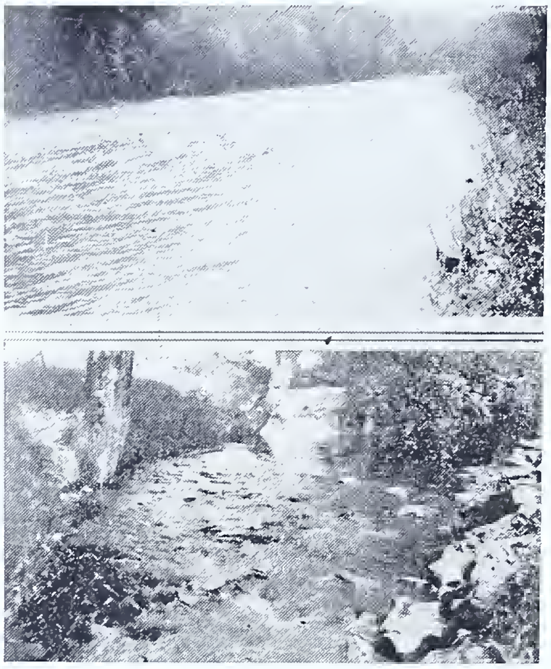
THAT the capacity of a stream to maintain fish life may be ascertained only when the water is at its lowest level is a fact recognized in fish culture.

Four years of intensive drought radically changed stream conditions in Pennsylvania. Trout waters formerly regarded as good streams were in many instances reduced to tiny rivulets, a few scattered stagnant pools, or dried up entirely. Lakes and ponds were reduced in area and depth. Receding water lines exposed to direct rays of the sun the bottoms of shallows that before the drought had served as ideal areas for foraging and spawning of fish native to these waters. An aftermath to each succeeding year of drought revealed not only widespread destruction to fish through injury to spawning areas, but a definite loss in food necessary to maintain life in the inland waters.

The Fish Commission, in meeting this dilemma of changing conditions in waters scheduled for stocking, devised a plan of stream survey in 1930 as a scientific checkmate to drought conditions. The survey was immediately initiated by trained personnel of the Commission, and announcement of its completion was made early this year. In making the announcement, the fact was stressed that this checkup of conditions had been accomplished, in most part, during periods of drought, and that a change in conditions, that is a year or more of normal rainfall and snowfall might easily double the mileage on trout waters scheduled for stocking on the basis of the survey. Field representatives are now rechecking waters, in some instances, to assure as wide a range as possible for stocking of fish from the hatcheries.

Results of the survey show that, at the present time, 5,603 miles of approved trout streams, 3,796 miles of approved warm water streams, and 139,435 acres of approved warm water lakes and ponds of the state are on the list for stocking. Only those streams and ponds sufficiently drought-resistant to maintain fish life during all seasons of the year were classified as approved. Extreme upper waters and tributaries of trout streams, while they were found to contain some trout and were being fished, could not be stocked owing to the drought effects. In some instances, lower waters of trout streams could not be stocked because of their proximity to polluted areas. This survey disclosed an appalling fact in that 15,983 miles of streams, at one time containing fish, were polluted to such an extent as not to warrant stocking. The beaver had erected 443 dams on waters approved in the survey, and some of these dams were found to have flooded considerable acreage.

Posted waters, in most instances trout streams, comprise a considerable portion of the fishing waters in Pennsylvania, it was disclosed. Streams posted have a total length of 782 miles, while 29,016 acres in ponds and lakes are closed to the public for fishing. Statistics gathered in the survey are now in the Fish Commission's files and form a valuable source of information for stream stocking.



APPROVED STREAMS

TOP: RAYSTOWN BRANCH OF JUNIATA RIVER—BASS WATER. BELOW: LACKAWAXEN CREEK—APPROVED TROUT STREAM

Four requisites in streams and lakes were taken into consideration in the survey—drought-resistance, presence of aquatic life or food for fish, natural cover, and proper water temperature. It was found in conducting the survey, that streams in limestone regions, fed by deep-seated springs ranked high from the angle of drought-resistance. Typical of these streams is Spring Creek, in Centre county, which has its source in 26 giant limestone springs, and ranks as one of the outstanding trout waters in the East.

The food angle is highly important in stream-stocking. During the drought, a great portion of the food available in smaller trout and warm water streams was destroyed. When a section of stream bed is exposed to the sun, not only smaller aquatic organisms are destroyed, but vegetation that is their source of growth and development is also killed. For this reason, a so-called "wet-weather" stream is capable of harboring little if any life. Larger streams, with their greater areas for forage development, while affected to some extent, are not damaged so seriously by drought.

Natural cover, not only on the shores of a stream but on the watershed it drains, is a vital consideration. This cover, if larger timber, serves to release water gradually that has been stored in the earth during wet seasons of the year. Timber on the shorelines comprises a source of insect food that falls on the water, and furnishes shade to assist in holding down the water temperature. Spring feeders of trout streams are also benefited by heavy overhanging foliage on their shores. Cover and water temperature are linked closely in their relationship to water supply during periods of drought, and were factors stressed in the survey.

Trout streams of Pennsylvania were classified in the survey for stocking with either brook trout or brown trout. While, in a few instances, both species are stocked in the same stream, it has been found that the larger trout streams are, as a rule, more adaptable to the brown trout, while the low temperature streams, fed by deep-seated springs in mountain and meadow land are preferable for brook trout stocking. From another angle, larger trout waters, although occasionally of fairly low temperature, more frequently are of higher temperature, hence suitable for brown trout.

Four groups of streams, ponds and lakes come under the warm water classification. First of these groups are waters adapted to black bass, yellow perch, sunfish, and catfish, and having these species. The second classification comprises waters having black bass, pike perch or wall-eyed pike, yellow perch, sunfish, and catfish; the third group, waters frequented by pike perch, yellow perch, sunfish, and catfish, and the fourth classification, waters inhabited by yellow perch, sunfish, and catfish. Approved waters contain, in addition to species listed, forage fishes including the minnow, and in most instances, the sucker.

In conducting the survey, a careful analysis of water characteristics, from the angle of adaptability for certain species of fish, was made. A small pond or lake, for example, that is now furnishing good fishing for less predatory species of fish, such as the bluegill sunfish, catfish, and suckers is not classified for stocking with black bass or other voracious species. Major waters of Pennsylvania, under the plan adopted, owing to the greater forage areas available, are classified for stocking with the black bass and wall-eyed pike. In the balanced system of propagation at the hatcheries not only raising and distribution of game fish such as trout and bass is stressed, but species popular with the fishing public, yellow perch, sunfish, and catfish are also distributed. Waters listed in the survey as suitable, from the standpoint of forage area and water temperature as good bass range, are stocked with the gamey bronzebacks, while smaller streams and ponds receive their quota of these species, if approved in the survey. This plan of distribution, conducted by the Fish Commission's personnel and equipment, has eliminated guesswork in stocking, and permits advantageous planting of bass and wall-eyed pike in waters to which they are particularly adapted.

In brief, the stream survey proved to be a most effective weapon in combating effects of the drought and saved thousands of fish that otherwise would have been sacrificed in waters not capable of sustaining fish life.

A black bass, smallmouth or largemouth, must be at least nine inches in length to be legal.

Pike-perch or wall-eyed pike and pickerel must be twelve inches in length to be legal. Muskellunge must be 22 inches in length to be legally taken.

To be legally taken, rock bass, white bass, crappie, and calico bass must be at least six inches in length.

FISH DISTRIBUTION HEAVY IN AUGUST

Fishing waters in Pennsylvania were stocked heavily with brook and brown trout, smallmouth and largemouth black bass, and bluegill sunfish during August. With higher water general in many sections of the state, distribution of 118,800 fingerling bass, 17,100 nine-inch brook trout, 5,700 ten-inch brown trout, and 25,000 bluegill sunfish fingerlings should be highly effective. Approved waters in 27 counties of the state were stocked with the bass, trout, and sunfish, which rank as favorites with the fishing fraternity.

LEGISLATION

For the information of fishermen, the following legislation was passed at the last session of the Legislature.

Bills Approved

House Bill No. 1809, Act No. 161, approved May 22, 1933, reducing the number of trout which can be taken in any one day from twenty-five (25) to twenty (20). It becomes effective next season.

Senate Bill No. 785, Act No. 305, approved June 2, 1933, effective August 1, 1933, permitting eel chutes from August 1st to November 30th, inclusive, from 4 p.m. to 8 a.m., Sundays, excepted, in:

North Branch of the Susquehanna below northern boundary of Berwick;

West Branch of the Susquehanna below the bridge at Northumberland-Lycoming County line;

Juniata River below Mount Union;

Delaware River below Easton.

License fee, in addition to fishing license, one dollar ($1.00). Applicant should communicate with Department of Revenue, State Capitol, Harrisburg, Pa.

Senate Bill No. 1205, Act No. 275, approved May 31, 1933, effective January 1, 1934, making changes in the Motor Boat Law.

Bills Vetoed

House Bill No. 92 permitting Sunday fishing in the Delaware River.

House Bill No. 2103, providing for the maintenance of persons committed to jail for non-payment of fines.

C. C. C. CAMPS ACTIVE

Reports received at the Fish Commission indicate that members of the Citizens Conservation Corps are active in improving streams and roads in the vicinity of their camps. Warden C. V. Long, of East Waterford, reports that boys in Camp 110, located in Kansas Valley, Perry County, have completed more than one hundred boulder dams on Kansas Valley Run, a favorite trout stream in central Pennsylvania.

A good earth road has been constructed covering the entire length of one of the favorite branches of Young Woman's Creek, Potter County, Windfall Run. Four miles of good trout water are opened to access by auto through this road, which was built by boys from Camp 137, located on the stream, according to Warden G. Dewey Grant, of Galeton.

Wardens of the Fish Commission have visited the camps frequently and addressed the workers concerning stream improvement and the Commission's program.

ACKNOWLEDGMENT

Acknowledgment is extended to the Game Commission for helpful advice offered in preparing the first printed number of Pennsylvania Angler. It is hoped that the Angler will fulfill a need for our fishermen as capably and well as does the Game Commission's publication, *Pennsylvania Game News*, for the hunters.

PECK'S POND PICKEREL

MORE THAN NINE LIVES FOR THIS SNAPPING TURTLE

Examination of the stomachs of snapping turtles, according to B. J. Schaffer of Easton, reveals that a chief item in their diet is the crayfish. The voracity of snapping turtles in taking food is illustrated by an incident submitted by Mr. Schaffer, who holds snapper soup in high esteem as a palatable dish.

Recently, the Easton fisherman was given a snapper by a farmer who told him that he had seen the big reptile sever the head from a duck before it was captured. Examination of the turtle's stomach contents revealed four objects not digested—a large two-inch beetle, purple and yellow in color, a small frog, a large crayfish, with one claw missing, and the duck's head with both eyes already digested.

The tenacity with which snappers will cling to life is illustrated in another instance cited.

A live snapper was fully submerged for ten minutes in boiling water. Taken from the water, the intestines were removed, and the heart was cut loose and laid on a table. For fifty-five minutes after removal, the snapper's heart continued to beat, Schaffer said.

THREE NEEDED TO LAND THIS FISH

While fishing in Tuscarora Creek, near East Waterford recently, Nevin White, five years old, hooked a two pound sucker. A tug of war resulted, the fish apparently having an edge in the argument at the start. As the battle raged, Nevin found that he was unwillingly forced to follow the fish to the edge of its element, the creek, according to Charles Long, Warden.

Reinforcements, Nevin's sister Esther and Richard Harvey, arrived on the scene of action in the nick of time, for the youthful disciple of Izaak Walton had just about decided that the fish was a trifle too large to be handled without embarrassment. After that, the sucker was triple-teamed successfully and landed.

FLIES FOR BASS GAIN IN POPULARITY

Sporting goods dealers report heavier sales of flies, spinners and other fly fishing tackle this year during the bass season than ever before. Perhaps two factors may account for this unprecedented popularity. First of all, the best interests of sportsmanship are served, and second, use of these highly effective lures does away with lugging heavy bait buckets and other live bait equipment during days astream.

Autumn fishing with fly and spinner is, contrary to belief in some angling quarters, very productive of good catches of not only bass, but pickerel and other game fish. It is always advisable to have a good standard set of flies, tied on No. 2 or No. 4 hooks, owing to a fickle disposition of game fish in striking. A fly that may be favorite for one fisherman, may, in the opinion of another, not be nearly so effective as his "pet." Probably a part explanation of this fact, rests in the manner of each individual in fishing, and in the conditions of stream and weather. A beginner in fly-fishing for bass may often tab a certain fly his pet if it brings to creel his first bass. Generally, one bass of fair size taken on light rod with fly and spinner is the only incentive needed to convert an angler to this splendid form of fishing.

Motion is a first requisite when fishing fly and spinner and the line should be taut practically all of the time. The glint of the spoon, whether nickel or brass, is an added incentive to bring a strike from a bass. Myron Shoemaker, a veteran fly fisherman, explains that fly and spinner may be used effectively by fishing it across current or against the current. Of course, waders are necessary, especially in autumn fishing when the water is chilly. During the summer an old pair of shoes will serve the purpose admirably.

The fly-fishing sport is gaining popularity in all sections of the state, an encouraging sign from the angle of fish conservation in Pennsylvania, for through this method, hundreds of undersize bass and other game fish will be left over for next year's sport. Give it a try.

SNAKE-KILLING CONTEST

The Pennsylvania State Fish and Game Protective Association of Philadelphia, a pioneer sportsmen's organization in Pennsylvania, is offering a prize to the member who kills the most watersnakes this year. Members have been requested to make monthly reports by post card to the Association office, and urged to rid the streams of these predators of fish life.

At least twenty-nine different families of fish are to be found in Pennsylvania inland waters, and approximately 135 species.

A catadromous fish is one that leaves the fresh water and goes to the sea to spawn. The eel is Pennsylvania's representative in this class.

HERE AND THERE IN ANGLERDOM

BOTH LOST

Warden Don Zeitler of Punxsutawney tells one that should take rank with the top-notch "strange incidents" of the present fishing season. Here it is, in his own words:

"The other day, while patrolling Little Mahoning Creek in Indiana County, I saw a very peculiar thing happen. I was walking down-stream and noticed a commotion in the water. At first I thought it was a bass feeding, but when I got close enough to see what it really was, I discovered it to be a snake. I took a shot at it, but missed and noticed it was heading for shore about as fast as it could go. (I had loaded about thirty-eight shells with bird shot for the purpose of shooting snakes, and the distance was too far for the shot to carry, so I started across the stream to try to get in a shot at closer range).

"Before I could approach to where I thought was close enough, however, a crow flew down, grabbed the fish the snake had, and was trying to get away. I took a long shot, and by sheer luck killed both crow and snake. The fish they were fighting over proved to be a seven-inch bass."

Autumn sucker fishing in southeastern Pennsylvania is now at its height, according to Warden Joel Young, of Fullerton. In many years service with the Fish Commission, Young reports, he never observed more fishermen trying their luck for suckers or more good catches than this fall. With water at good levels owing to recent rainfall and the streambeds swept clean of much natural food for suckers, excellent fishing is in prospect in all sections of the state.

* * *

The Perkiomen Creek, famous southeastern Pennsylvania bass stream, is yielding splendid catches of bass this year, writes Warden J. Clayton Reed, of Ambler. A smallmouth bass, 20½ inches in length, was taken at Green Lane by Lew Embody, Pottstown angler. Earl Dingler, Pine Forge, landed a smallmouth measuring 18¼ inches, and George Lessig, Pine Forge, two smallmouths, one 18½ inches, and the other 17¼ inches in length.

* * *

Finding a snapping turtle on the William Penn highway, where it parallels the Juniata river near Huntingdon, W. H. Shafer, of Huntingdon discovered that one of its legs had evidently been crushed by a car. Taken to his home, it was scalded, and when opened, twelve eggs were found. The eggs were planted in sand, and despite the scalding, two hatched, writes Warden C. V. Long, East Waterford. One of the young turtles is still living.

* * *

Bald Eagle Creek, near Mill Hall, yielded a snake-eating wall-eyed pike to William Laubaugh, Mill Hall fisherman, recently. When opened, the 22-inch pike was found to contain an 18-inch watersnake, Warden George Sperring, Lock Haven, informs the ANGLER.

* * *

Canadohta Lake's record muskellunge for 1933 was landed recently by Walford Larsen of Titusville. Larson battled his catch, which weighed 30 pounds and was 49½ inches in length, for almost three hours before killing it.

A SUCKER CATCH

Check on this fact on your next fishing trip. A veteran bait caster remarked recently that it has been his observation, in noting the striking habits of fish, that the pickerel strikes the lure from behind, the bass from the side.

* * *

Cocolamus Creek, in Perry county, is furnishing fine bass and pickerel fishing this year. George Fry of Harrisburg recently landed eight pickerel. four black bass and four rock bass in a day's fishing with fly and spinner.

* * *

The dam near Newton Hamilton on the Juniata river is yielding nice catches of bass. During the present season, C. F. Gehret of Altoona has taken 127 this season, including a number of largemouth bass.

* * *

Good catches of smallmouth bass have been made this season near the headwaters of Tuscarora creek by John Blair of Blair's Mills.

Feminine anglers are taking some laurels this summer, even in fishing for the savage muskellunge. Mrs. Frank Nelson, of Greenville, recently landed a 12-pounder in Conneaut Lake, Warden J. S. Cannon writes.

* * *

French Creek, in Erie county, according to Special Warden W. E. Briggs, is providing great bass fishing. An angler from McDonald recently caught seven smallmouths having a combined weight of 23 pounds before breakfast one morning.

* * *

Warden Frank Brink of Milford writes that Pike county's fishing waters are yielding great catches this year. Everett Leicht, guide, recently headed a party that landed 24 fine smallmouth bass and one six pound wall-eyed pike during a day's fishing on the Delaware near Milford.

* * *

Warden David Dahlgren of Philipsburg tells of an incident that occurred while stocking brook trout in Big Trout Run, Centre County, which illustrates the boldness of watersnakes in taking their prey. As the trout were being released, a large snake approached to within a few feet of the man with the bucket, and caught an eight-inch trout. When struck at, it reluctantly released its prey and disappeared.

* * *

Twenty-five large bullfrogs were taken on the opening day of the frog season in Kephart Dam by Al Jones of Philipsburg.

* * *

Trout waters in southwestern Pennsylvania yielded a number of splendid rainbow trout during the season, according to Warden James Banning, of Connellsville. A rainbow, length 24 inches, girth 12½ inches, and weight 4¾ pounds was caught in Breakneck Reservoir, by George Bulebush of Connellsville. Another rainbow, 23½ inches long and weighing 4 pounds 2 ounces, was taken from Laurel Run by James Bates of Scottdale. Two other rainbows over three pounds were caught.

* * *

A brace of splendid smallmouth bass were taken from the Raystown Branch of the Juniata recently by Tom Suiters, of Everett, according to Special Warden W. A. Keebaugh, of Hustontown. The smaller bass, 18 inches in length, weighed three pounds, the larger, 19 inches, three and one-half pounds.

PLEASANT MOUNT, Wayne County, Penna.

PLEASANT MOUNT HATCHERY

▪■▪

The Fish Commission maintains eight major fish hatcheries, devoted to improvement of fishing in Pennsylvania. Just as a suggestion, why not visit one of these great fish producing plants? You will be welcomed cordially, and an afternoon spent in inspecting any hatchery should bring you closer to your favorite sport.

KNOW MORE ABOUT THE FISH YOU CATCH

Fish Hatcheries and Locations: REYNOLDSDALE, Bedford County; TIONESTA, Forest County; BELLEFONTE, Centre County; ERIE, Erie County; TORRESDALE, Philadelphia County; CORRY, Erie County; UNION CITY, Erie County.

OCTOBER

Mist rising from stream or lake, fallen leaves on the water, the shore lines a medley of brilliant colored foliage. There is zest in October fishing.

Satisfaction, too, for black bass, pickerel, and wall-eyed pike are striking. Look to the future, if an undersize game fish is taken. Carefully returned to the water, it will help your sport next year.

PENNSYLVANIA ANGLER

Photo by M. J. Myers

A Member of the Bullfrog Chorus

[illegible]
PENNA. STATE LIBRARY
1.6

VOL. 2
NO. 11

OFFICIAL PUBLICATION
BOARD OF FISH COMMISSIONERS

NOVEMBER
1933

OFFICIAL STATE
PUBLICATION

PENNSYLVANIA ANGLER

NOVEMBER, 1933
Vol. 2 No. 11

PUBLISHED MONTHLY
by the
Pennsylvania Board of Fish Commissioners

* * *

Five cents a copy — 50 cents a year

* * *

ALEX P. SWEIGART, *Editor*
South Office Bldg., Harrisburg, Pa.

GEORGE GRAY, *Illustrator*

* * *

NOTE

Subscriptions to the PENNSYLVANIA ANGLER should be addressed to the Editor. Submit fee either by check or money order payable to the Commonwealth of Pennsylvania. Stamps not acceptable.

PENNSYLVANIA ANGLER welcomes contributions and photos of catches from its readers. Proper credit will be given to contributors.

All contributions returned if accompanied by first class postage.

Want Good Fishing?

OBEY THE LAW

COMMONWEALTH OF PENNSYLVANIA
BOARD OF FISH COMMISSIONERS

OLIVER M. DEIBLER
Commissioner of Fisheries

* * *

Members of Board
OLIVER M. DEIBLER, *Chairman*
Greensburg

JOHN HAMBERGER
Erie

M. A. RILEY
Ellwood City

DAN R. SCHNABEL
Johnstown

LESLIE W. SEYLAR
McConnellsburg

EDGAR W. NICHOLSON
Philadelphia

KENNETH A. REID
Connellsville

ROY SMULL
Mackeyville

H. R. STACKHOUSE
Secretary to Board

C. R. BULLER
Deputy Commissioner of Fisheries
Pleasant Mount

IMPORTANT—The Editor should be notified immediately of change in subscriber's address

Permission to reprint will be granted provided proper credit notice is given

PENNSYLVANIA ANGLER

NOVEMBER, 1933

VOL. 2 No. 11

EDITORIAL

●

The Sportsman's Part in Fish Conservation

By Gifford Pinchot,
Governor of Pennsylvania

BETTER fishing is not the result of any single cause, but of a lot of causes working together.

Mass production of fish as practiced in Pennsylvania by the Fish Commission is absolutely necessary to meet the constantly increasing demand for better fishing. As industries spread and as more and more fishing waters are taken up by clubs and private preserves, it is obvious that the waters available to fishermen must grow steadily less. Without intensive stocking each year these waters cannot yield good fishing for the great army of licensed fishermen.

And that means a balanced system of fish propagation. It means the raising not only of the kinds of game fish, such as trout and bass, but also the production of great quantities of sunfish, catfish, perch, and other lesser species. Somebody likes to catch every kind of fish there is.

But mass production of fish standing alone is not enough. It is the conduct of the average fisherman that holds the key to better fishing. What the fishermen do with the fish or for the fish after they are distributed is a good deal more important than how many fish are planted.

The fishermen can increase the sport they get in two principal ways: The first is by stream improvement.

So far we have given very little attention to stream improvement, but I am glad and proud to say that under the direction of Commissioner Deibler stream improvement is beginning to play an important part in providing better fishing for the fishermen of Pennsylvania.

The number of trout a stream can carry depends on the condition and amount of food in the stream. Many of us older fishermen remember when the streams of Pennsylvania carried many times the number of trout most of them do today. Stream improvement can bring back the carrying power of our streams. We cannot afford to neglect it any longer.

In many parts of the State stream improvement projects which will definitely better the fishing have been undertaken on trout waters. Dams, boulder and log deflectors, and additional covers are easy to build and are of real practical advantage. Valuable work in stream improvement was done by a number of Citizens Conservation Corps Camps during the summer.

Stream improvement does three things. It provides food, because more insects are produced in streams that have been improved. It gives cover to the fish, and it secures better water temperature in trout streams. It is an established fact that trout food is increased, better cover is made available, and the water is cooler because speeded up through the instalment of stream improvements.

The second way by which fishermen can improve their fishing is by using the artificial fly instead of bait, and particularly the barbless fly. There are two reasons for using the fly.

One is because there is immensely more sport to be gotten out of fishing with the fly than fishing with any kind of bait. The fight a trout or a bass taken on a fly makes against a light fly rod is one of the most fascinating things I know. Fly casting is full of interest. Whether you catch anything or whether you do not, every cast is a little enterprise all by itself, and the satisfaction of making a really good cast is reward enough for making it.

Again, when a trout or a bass takes a fly it is taken on the surface. That to me is forty times as interesting as a strike under the surface which I cannot see.

Moreover, dry fly fishing is the only sport I know that is hunting and fishing too. A trout rising in still water in the middle of the day under the bright sun is fair game for a dry fly. It would be hopeless to think of taking it with a wet fly or with any kind of bait.

In dry fly fishing you see your game and then go after it as you do in stalking a deer. The accuracy of the cast necessary to take a trout under the conditions just described is by no means unlike the accuracy of the shot required to bring down the head of big game you have stalked.

But the greater sport to be had from fly fishing, and especially from dry fly fishing, is by no means the only reason for practicing it. Trout hooked on a fly are usually hooked in the lips. They are seldom hooked in the gills, and the fly is never swallowed. That means that little trout can be returned to the water unhurt, when hooked on a barbed fly.

But if a barbless fly is used, if you have either pressed flat or broken off the barb of your hook with a pair of sharp-nosed pliers, then you can return to the water entirely unhurt at least 95 per cent of all undersized trout. In the great majority of cases you need not touch the fish at all, merely turn the hook point downward and the fish falls off.

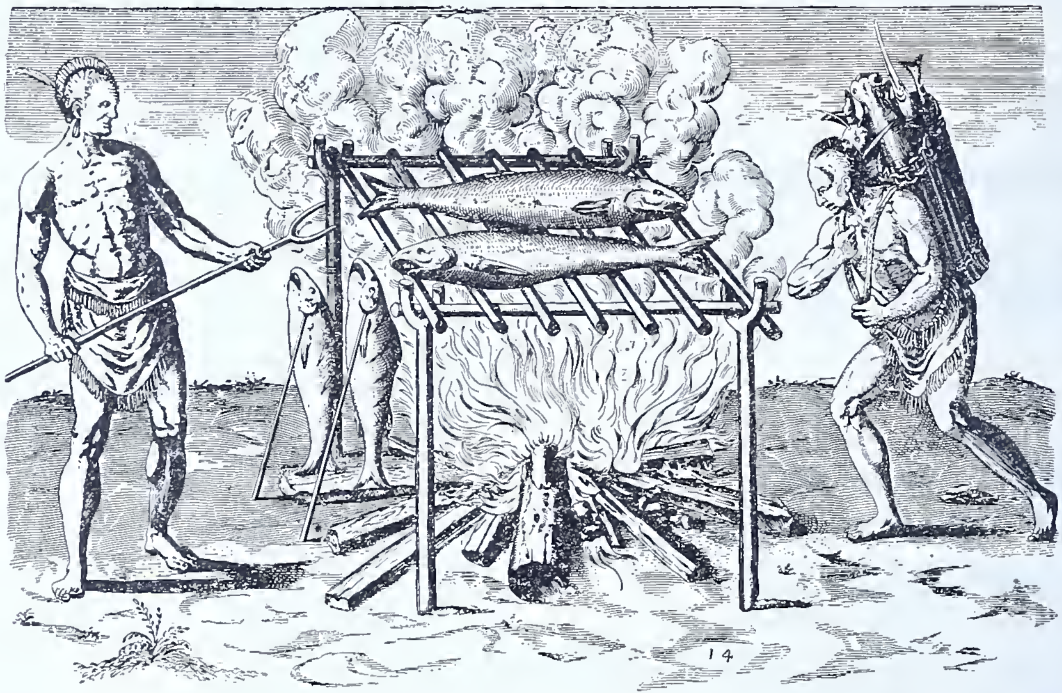
I have been fishing for trout, bass, and pickerel only with a fly, and only with a barbless hook, for many years. I find the barbless hook makes almost no difference in the amount of my catch. Certainly I save five fish for every six I would have saved fishing with a barb. But it does make an immense difference in my ability to turn back unhurt young fish either below the legal limit or below the higher limit I have long since established for myself.

Every year countless thousands of young trout, bass, pickerel, and other game fish under legal size are destroyed in bait fishing or in plug fishing. In another year many of these fish would have reached legal size. Many of them would have survived to be big fish. There is probably nothing which more effectively prevents better fishing in Pennsylvania streams than the loss of these young fish.

I do not overlook the necessity for increased production of fish. Two new hatcheries at Huntsdale, Cumberland County, and Spring Creek, Centre County, have recently been developed, and many more warm water species of fish will be grown at other hatcheries of the State Fish Commission. Pennsylvania hatcheries are producing more and more fish. But when all is said and done, the fisherman himself is the key to better fishing.

Better sportsmanship on each fisherman's part means better fishing for him and for everybody else. No amount of stocking will take the place of good sportsmanship on the stream. "Better fishing for every fisherman" is in the hands of every angler.

When Red Men Fi



INDIANS COOKING FISH (FROM AN OLD PRINT)

TO Pennsylvania's first fisherman, the red man, catching fish was more than an art. It was a major source of livelihood, for he relied upon the water courses in his quest for food. Evidence is not lacking to confirm this fact. Preserved in the charcoal of fires that had once burned in Indian villages, whether they were located on the shore of some great waterway or miles away from it, were found many bones, and predominating were the bones of fishes. Then, of course, the supply of fish was so vast that incursions of the Indian, no matter how heavy, had little appreciable effect.

An early historian, commenting on the great migrations of shad, herring and sturgeon in the Susquehanna and Delaware Rivers, observed that "so immense were the multitudes of these fish that the still waters seemed to fill with eddies while the shallows were beaten into foam by them as they struggled to reach their spawning grounds." In the colder streams of mountain and lowland were charr or brook trout in abundance, while smaller streams, tributary to the great rivers, abounded in suckers, pickerel, catfish, and other native species. Here was a mammoth source of food supply, and to the red man, dependent as he was upon the crop of fish and game for existence, it constituted a vital necessity.

There is reason to believe, from evidence garnered in the charcoal from Indian fires, that fish of that era were larger than those caught today. Skeletons of suckers and catfish of more than double the present day size were unearthed. Brook trout skeletons, indicating that when in the flesh the fish must have weighed from two to four pounds, were discovered, while instances of shad skeletons from fish weighing presumably twelve pounds in the flesh were found. Without doubt, this greater size is to be attributed to the vast supply of forage present in the waters three hundred years ago.

How did the Indian fish? Before considering the implements then used in taking fish, one fact should be emphasized. Food was an elemental consideration and harvesting of the fish crop was a factor that might easily determine the difference between food abundance or hunger for a tribe. Today sport in fishing presents a strong contrast to the red man's system of fishing for food. In pursuit of fish, the Indians used weirs and traps, seines, gill nets and scoop nets, spears, gigs, bows and arrows, hand, pole, and set lines. So essential was the fish crop that they even built pens in which fish could be kept alive until needed. Their implements for fishing were skilfully made, and not only the men, but the squaws and children participated in fishing. The children relied chiefly on bows and arrows in taking fish, and were exceptionally adept in their use.

One early writer said: "The Indians always carry hooks and small harpoons with them whenever they go on a hunting party; but at certain seasons of the year they go out purposely to fish, either alone or in parties. They make use of the neat and light canoes made of birch bark * * * and venture with them into spacious rivers."

Shooting fish with bow and arrow, the Indian boys eagerly waded through shallows in quest of the brook trout, or sought the more sluggish sucker and catfish in creek and river. Arrows used in taking fish were equipped with long slender tips of the finest stone obtainable. On the shores of the Susquehanna and Delaware, many of these slender arrowheads have been found.

When the vast migrations of shad and herring appeared, surging in countless numbers to their spawning beds, the tribes, men, women and boys, gathered from miles inland for this great fish taking enterprise. In capturing the fish, drive ways were used. Huge V-shaped pens were constructed of rocks. Shouting and beating the water, every available member of the tribe then moved up the stream, driving the mass of shad and herring before them. When the enclosure literally boiled with the fish, a hempen net was stretched across the tips of the V, and the tribes proceeded to take the trapped fish at their leisure.

A letter written in 1680 by Mahlon Stacy, one of the first settlers in New Jersey furnishes interesting sidelights on this system of driving fish. His letter to a brother in England follows in part:

"But now a word or two of those strange reports you hear of us and our country. I affirm they are not true, but fear they were spoke from a spirit of envy. It is a country that produceth all things for the support and sustenance of man in a plentiful manner; if it were not so, I should be ashamed of what I have before written. * * * Fish in this season are very plentious. My cousin, Revell, and I, with some of my men, went last third month into the river (the Delaware) to catch herrings, for at that time they came in great shoals into the shallows. We had neither rod nor net, but, after the Indian fashion, made a round pinfold, about two yards over, and a foot high, but left a gap for the fish to go in at, and made a bush to lay in the gap to keep the fish in; and when that was done, we took two long birches and tied their tops together, and went about a stone's cast above our said pinfold; then hauling these birch boughs down the stream, where we drove thousands before us, but so many got into our trap as it would hold. And then we began to haul them on shore, as fast as three or four of us could, but two or three a time, and after this manner, in half an hour, we could have filled a three-bushel sack of as good, large herring as ever I saw."

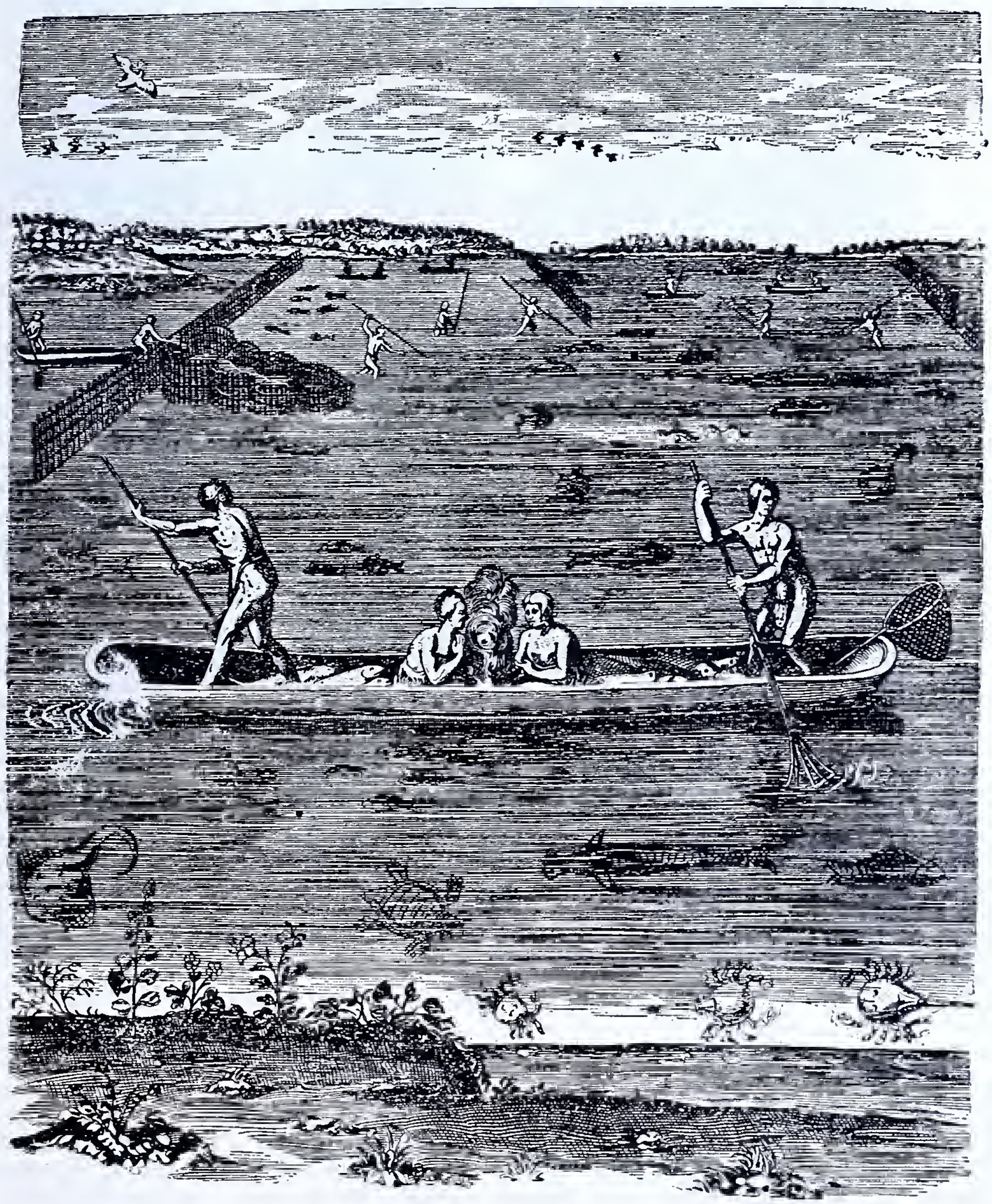
In fashioning gigs, the red men must have spent a great deal of time. Relics found

ed in Pennsylvania

along the Susquehanna and Delaware are in many instances fashioned exquisitely and with painstaking care. Jasper and quartz were apparently favored as material, and these spears or gigs were used in the taking of great fish such as the sturgeon. Hooks and lines were made with equal care. Skilfully woven hemp lines and hooks made from stone, bone or bird claws were used. Dipsies used with hand and pole lines were also artistically made, the most elaborate being fashioned of hematite and shaped somewhat like a common plumb bob. It was said that many of the early colonists used these Indian fishing devices in preference to those brought from abroad.

Hook and line fishing, as indulged in by the red man, is quaintly described by Harriot, who wrote concerning Indian angling methods in 1585.

"They have likewise a notable way to catche fishe in their Rivers, for whereas they lacke both yron and steele, they fasten unto their Reedes or longe Rodds the hollow tayle of a certain fish like to a sea crabb, in steede of a poynte, wherewith by nighte or day they stricke fishes and take them off into their boates. They also know how to use the prickles of other fishes. They also make weares, with settinge opp reeds or twigs in the water, which they soe plant one with another that they growe still narrower and narrower, as appeareth by this figure. Ther was never seen among us soe cunninge a way to take fish withall, whereof sondrie sorts as they founde in their rivers unlike unto ours, which are also of a verye good taste. Doubtless yt is a pleasant sighte to see the people, sometymes wadinge, and goinge sometymes sailinge in those Rivers, which are shallowe and not deepe, free from all care of heaping opp Riches for their posterite, content with their state, and living frendlye together of those things which God of his bountye hath given unto them, yet without giving Hym any thankes according to His desarte. So savage is this people and deprived of the true knowledge of God. For they have none other than is mentioned before in this worke."



INDIAN FISHING METHODS (FROM AN OLD PRINT)

Harriot also commented on methods employed by the red men in cooking fish.

"After they have taken store of fishe," he wrote, "they gett them unto a place fitt to dress yt. Ther they sticke upp in the grownde 4 stakes in a square roome and lay 4 potes (poles) upon them and others over thwart the same, the like unto an hurdle of sufficient heighte, and laying their fishe upon this hurdle, they make fyre underneathe to broile the same, not after the manner of the people of Florida, which do but schorte (scorch) and harden their meate in the smoke only to Reserve the same during all the winter. For this people, reservinge nothing for store, thei do broile and spend away all att once, and when they have further need they roste or seethe fresh, as we shall see hereafter. And when as the hurdle can not holde all the fishes, they hange the Reste by the fyrres on sticks set upp in the grounds againste the fyrres, and when they finishe the reste of their cookerye. They take good heede that they bee not burntt. When the first are broyled they lay others on that weare newlye broughte, continuing the dressinge of their meate in this sorte (manner) until they thincke they have sufficient."

During the colonization period, when the tide of settlement passed beyond the Alleghenies, Indian fishermen of friendly tribes plied an active trade of bartering fish with the settlers. Great abundance of fish in Pennsylvania waters continued for more than a century after most of the tribes had moved toward the west, and in fishing the colonists undoubtedly used and improved on devices that the red man had found so effective.

From Minnows to Bass— • Balance in Stocking •

BALANCE is a feature in Pennsylvania's fish stocking program. Under the present system of propagation and distribution, improvement of sucker fishing is given as much consideration as betterment of angling for trout, bass, and other game fishes. Propagation of the minnow, an essential source of forage for voracious species of game fish, is also stressed.

A glance through figures for distribution during 1932 serves to explain this program. Trout, brook and brown, ranging in size from six to 12 inches, numbered 1,098,741; black bass, smallmouth and largemouth, fingerlings, 205,030; pike perch or wall-eyed pike, fry, 35,754,050, and pickerel, adult, 4,280. In the panfish classification, 1,912,050 sunfish, from one to four inches in length, 390,774,992 yellow perch, fry to adult, 406,793 bullhead catfish, from two to 10 inches, and 15,028,770 suckers, fry to adult, were stocked last year. Minnows released varying in size from one to four inches, numbered 996,560, and frog tadpoles, from one to four inches, 877,700. Lake Erie was stocked with blue pike, cisco, and large trout fry, hatched on batteries at the Erie hatchery.

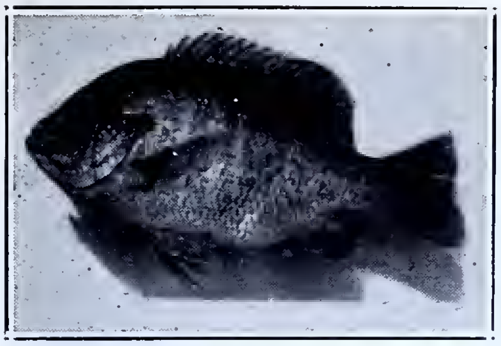
HATCHING BATTERY IN OPERATION

Pennsylvania has thousands of sucker fishermen who find sport on easily accessible waters during winter and early spring months. Heavy catches of these fish during recent years have steadily increased. In part, this betterment of sucker fishing may be attributed to outlawing the gig in taking fish, while heavy stocking has been beneficial. In the panfish group, bluegill sunfish, yellow perch, and catfish rank as favorites with the fishing public. Taking bait readily, these popular fish constitute an important portion of the annual catch in the inland waters. Smaller streams, ponds and lakes may be stocked with these species to advantage, hence a wide range for distribution is available. Minnow distribution is particularly effective in larger bodies of water containing bass, pike perch, or pickerel.

Two objectives are attained through this system of stocking. Nature's balance, so essential in holding waters at the peak of their production, is benefited, and greater variety is assured for fishermen during days astream.

Balance in aquatic life, that is, presence of a number of different species of fish in a body of water is recognized as an essential factor for good fishing. Bullhead catfish and suckers, for instance, are bottom feeders, relying for existence upon a source of food supply that might otherwise be wasted. Black bass, pickerel and wall-eyed pike take their food from the minnow schools, stone catfish, and other types of forage fish. Insects, worms, and small aquatic organisms comprise the food supply, in large part, of the forage fishes. Sunfish, rock bass, and yellow perch are classed as shore feeders, relying upon food such as insects that may fall to the surface of the water near shore. These species also feed to some extent upon the minnow schools and other live forage.

From the fisherman's viewpoint, balanced stocking of the inland waters has another important angle. Pennsylvania fish laws permit that every day of the year, Sundays excepted, fish of one species or another may be legally caught by licensed anglers. A mild winter day, for example is ideal for sucker fishing, and for this type of sport, the fisherman is generally within range of



BLUEGILL SUNFISH

streams yielding good sucker catches. Warm water ponds, streams and lakes afford fine fishing for bluegill sunfish, yellow perch, and catfish during May and June. The peak of the trout season comes usually during these months, and many trout streams yield not only good brook trout creels, but excellent brown trout fishing as well. Variety in fishing is advantageous to the bass fisherman who may find these game fish not responsive to his lures. As a sideline to bass fishing, bluegills, yellow perch or catfish offer fine sport.

First consideration, before stocking any recently created body of water with black bass or other game fish, is infusion of the area with an abundance of forage. This objective may be attained after aquatic vegetation has developed. In logical sequence, minnows are introduced, followed by less voracious species of fish such as the yellow perch, catfish, or bluegill sunfish. Young perch form an important source of food for voracious species, and the high rate of reproduction characteristic of the perch makes it a valuable forage fish for a body of water to which it is adapted. In larger waters, after the food supply has been sufficiently increased, bass, pike perch, and pickerel may be introduced to advantage.

Scientific stocking of Lake Wallenpaupack in Pike and Wayne Counties, after its formation, was a vital factor in its development as a superb fishing area. Catches, not only of bass, pike-perch, and pickerel, but panfish as well, during the present season have been amazing. Wall-eyed pike weighing over 10 pounds, smallmouth bass, largemouth bass, and pickerel exceeding five pounds in weight have been taken consistently. This lake, opened to the public for fishing in 1927, today ranks as an outstanding fishing water in eastern Pennsylvania. Stumps, sunken logs, and other cover were left in the area to be flooded and now furnish good cover for fish introduced under a vast stocking plan covering a period of approximately ten years. Another feature of the fishing on Wallenpaupack recently has been the catch of thousands of large bullhead catfish.

A similar plan of stocking the giant Pymatuning Dam in northwestern Pennsylvania will be adopted with its completion, and it is anticipated that this great artificial body of water will provide excellent fishing in the future for anglers in the western part of the state.

Bullheads spawn in May and June, depositing their eggs in holes in the banks or pond bottoms.

RESERVOIR BASS

Large Mouth Bass In Artificial Reservoirs

By Kenneth A. Reid

Member, Board of Fish Commissioners

IN Fayette and Westmoreland Counties there is practically no natural bass water due to the mine pollution of all the larger streams that formerly contained bass. The bass fishing in these counties has been confined entirely to artificial reservoirs.

In the drawing of coke from beehive ovens, large quantities of water was used. For this water supply, many of the old coke plants built reservoirs varying in size from as small as three or four acres to as large as twenty or thirty acres. One, the Bridgeport Dam, is considerably larger, but most of them are from six to ten acres in area. Their depth at the dams will vary from eight to ten to as much as twenty or thirty feet in a few cases. Many of them are now considerably silted with mud and have extensive areas of mud flat shallows, often grown up with weeds.

The majority of these reservoirs were stocked with large mouth bass and crappie years ago. Blue gills, catfish and suckers are also found in several of them. One of them about ten acres in extent contains largemouth bass, crappie, blue gills, minnows and crayfish. It has not been stocked for twenty years and is fished hard every day of the season. Bass reproduce naturally and apparently take care of the heavy annual catch. This season I saw hundreds of small ones along the shore in the shallows.

These reservoirs furnish a great deal of sport to the fishermen of these two counties. In fact there are hundreds of people who fish nowhere else, and who would not take out a fishing license except for them. They afford about the only opportunity for bass fishing without travelling from fifty to well over a hundred miles.

While they are fished very hard throughout the season, it is not at all uncommon for one fisherman to take from three to five or six decent bass in an evening fishing. The usual run will be from nine to twelve or fourteen inches, but bass of two and three pounds are not uncommon. The fly rod with floating bucktail lures has proven very successful, and within the past year a large number of fishermen, who formerly used live minnows, have discarded this method for the fly rod and artificial lures. One of them, Ross Medcalf of Connellsville, who used the fly rod on bass for the first time this year, took ten one evening on the hair frog that ranged from ten to thirteen inches from the Smock Reservoir. Since that time he has restricted his "keep fish" to a few of the largest ones, and has taken several from three to four pounds.

While these fly rod lures have accounted for a great many bass—more good fish than their users formerly took with live bait—their use will make for better fishing in the future because the tremendous loss from injured small bass taken on live bait is eliminated. The fishermen are enjoying more sport than formerly and fishing for the sport rather than a large catch of fish to take home.

The introduction of the largemouth bass into these reservoirs has proven a great boon to the fishermen. It seems to be able to

(Continued on Page 15)

BROOD POND FOR BASS AT PLEASANT MOUNT

The Black Bass at Pleasant Mount

By C. R. Buller

Deputy Commissioner of Fisheries

Of the two species of black bass, the Board of Fish Commissioners extends its greater efforts to propagation of the smallmouth, for the reason that they are best adapted to the waters that are suitable for bass, namely: the rivers and large streams, such as the Susquehanna, Juniata, Conodoguinet, French Creek and others. In recent years, however, this branch of fish culture has been extended to include also the largemouth bass.

Bass are so voracious that they require a large range. In every instance where they have been introduced into a small area, it has been to the detriment of the other fish and for that reason, the Board of Fish Commissioners has endeavored by stocking and protecting, to maintain good bass fishing in the rivers and larger streams, and requests the fishermen not to apply for bass for stocking small areas.

Of the many different kinds of fish reared and sent out for stocking purposes, the artificial raising in large numbers of the smallmouth black bass is the most difficult and expensive problem yet undertaken. The difficulties the fish culturists have encountered in this work, are not only limited to Pennsylvania but to fish culturists in the other states, as well as Canada, who are encountering the same serious handicaps.

Through its research work, Pennsylvania feels that it has made big strides in the last few years in their artificial culture and sends out each year a great many bass for distribution, of a size well fitted to cope with unnatural conditions existing in many of our waters. Nevertheless, this work is still in a more or less experimental stage, with no fixed mode of procedure that could be set forth as a guide for private individuals interested in this work.

Character of the Water Supply

All bass culture is carried on at the Wayne Hatchery located at Pleasant Mount, Wayne County. For convenience, the hatchery superintendent has the plant divided into four units.

A portion of Unit No. 1 is devoted to bass culture. The water supply for this area comes from springs, whose water is collected in a large storage dam where it is permitted to age and temper and is then conducted through a natural creek channel for a distance of approximately two miles, before entering the bass ponds.

Unit No. 3 covering approximately one hundred water acres is also devoted to bass. This area obtains its water from springs and it is conducted without being tempered or aged through a natural creek channel, for a distance of approximately one mile, before being used.

The bass-raising ponds range in area from one-half acre to one hundred acres, with a depth ranging from several inches along the shore lines, to from four to eight feet at the overflow. In the construction and preparation of these ponds, natural conditions are imitated as near as is possible and practical. A rich growth of aquatic plant life is preferred, with an abundant growth of semi-aquatic plants along the shore line. These natural conditions with special reference to the plant life, are favorable for the natural accumulation of organisms, many of which are utilized as fish food.

All ponds are constructed so that the water supply is under control and the area can be drained practically dry when desired. The ability to drain these areas is necessary, in order to properly fertilize and set up the pond bottoms for each year's crop and to be able to remove any undesirable species of fish which may accidentally enter the area. By undesirable species, we have reference to such fish as the pickerel, pike perch, or in fact any fish that would take toll by feeding directly on the smaller bass or by being competitors for the same source of food supply.

As soon as the bass are through spawning and caring for the baby fish, they are collected in most instances from the brood ponds and confined in more or less crowded conditions throughout the late summer, fall and winter months. This is done so that the same brood ponds can be utilized for the rearing of other crops, such as the sunfish or catfish, throughout the summer and fall months, and for retaining brook trout throughout the winter. In the early spring, the brood ponds are cleaned of all other species of fish and a certain number of parent bass introduced into each one, for the purpose of reproduction. The number of parent fish allotted to a pond depends principally upon its size.

Thus far fish culturists have not been able to devise an artificial food upon which adult bass will feed and thrive. While it is true that they can be induced to feed sparingly on certain artificial foods, some essential element or elements appear to be lacking, with the result that many of them quickly succumb to disease or become barren the following season. If the hatchery superintendent feeds his fish in such a manner that the majority of his brood stock becomes barren, he will naturally have a great shortage of offspring. Therefore, this must be guarded against, and in order to do this with what knowledge we have at the present time, the bass must be fed upon the natural foods that would be predominating if they were living in a wild state, such as live fish, crayfish, tadpoles, and aquatic insects. The live fish which we propagate and utilize for this purpose are different species of minnows.

In the feeding of the baby bass, the natural food is also required. It is needless to say that to produce this enormous crop of forage is a task requiring considerable knowledge of just what is needed, and in this work we are devoting approximately as many water acres to the forage culture as to the bass culture. During a portion of the winter months the bass lie dormant, at which time they are consuming very little food, which follows that during the fall months they must be supplied with such natural food as they will consume, or they will lack the vitality during the dormant period to develop the next season's egg supply, with the result that if under-nourished, the next season's crop would be a failure. In coming from their hibernation, they must again be supplied with abundant food, containing their natural requirements or they will not be in condition to carry them safely through the delicate period of spawning.

Spawning

Thus far, fish culturists have not been able to improve on the parent bass method of caring for the eggs and very young fish. For this reason a certain number of parent fish are placed in each brood pond at the approach of the reproduction period, where they are permitted to prepare their nests, deposit their eggs, and care for them and the very young fish, in their own way.

In Pennsylvania, the spawning takes place generally during the last half of May or the first half of June, the time depending much upon the weather conditions. At the approach of the time when the females are ready to give forth their eggs, the male selects a suitable place and proceeds to build a nest. This consists generally of a place on the gravel bottom where he removes all sediment, sticks, leaves, and other material, leaving only the cleanly washed gravel. The nests vary greatly in size, ranging from eighteen inches to three feet in diameter. After the nest has been carefully prepared, the male entices the female to come upon the nest and deposit her eggs. As the eggs come forth, they are very sticky, with the result that they cling to the cleanly washed gravel of the nest.

A TYPICAL PENNSYLVANIA SMALL MOUTH BASS

After the eggs have been extruded, the female departs leaving the responsibility of caring for the eggs and offspring to the male parent. This care consists of keeping away the enemies, fanning the nest by fin and body motion to keep up water circulation and preventing the accumulation of sediment which may smother the eggs or young fish.

When the bass first hatch, they have attached to the lower portion of their bodies yolk sacs which furnish them with nourishment for a short time. As it is gradually absorbed, they gain in strength and each day swim farther from the nest, settling back upon it or near it at nightfall. By the time the sac is entirely absorbed or nearly so, they require a larger feeding range, with the result that they leave the protection of the parent and lead a more or less separate existence.

During the period that the parent fish is protecting the eggs and offspring, he feeds very sparingly, with the result that by the time his services are no longer required he is very hungry and would not hesitate to devour his own offspring or others of the same species. It follows that in order to obtain the best results, the fish culturists must remove the baby bass from the brood ponds just before they leave the protection of the parent. The baby bass are placed in nursery ponds which have been previously prepared for them.

Food of the Baby Bass

A few weeks before the baby bass is transferred from the brood ponds to the nursery ponds, the nursery ponds are set up or gotten in readiness by treating the pond bottoms with fertilizers and chemicals and retarding the water flow. They are then inoculated with small aquatic organisms, principally daphnia or water fleas which are the first food of the baby fish. The treating of the pond bottoms is for the purpose of creating a condition beneficial for the natural propagation of the organisms introduced. If conditions are ideal, by the time the bass are ready to be introduced, a large crop of organisms for them to feed upon will be available in the ponds. However, before the bass are introduced, fine mesh screens are inserted at the overflows and the water flow increased for some time, in order to purify the water. This food crop that has accumulated in the ponds, will feed the baby fish for a short time, but as it is gradually depleted, additional food must be introduced. As with the adult, no practical method of artificial feeding is known, with the result that they must be fed also on the foods nature intended them to have. They go through a number of different feeding stages and for convenience we have divided these into three stages—first: the sac feeding stage or the period when they are subsisting on the nourishment taken from the yolk sac; second: the daphnia feeding stage or the period when they are feeding upon small aquatic organisms consisting principally of the so-called water fleas, of which the daphnia and cyclops predominate, and third; the fish feeding stage or the time starting when they can eat small fish life. The last two stages overlap greatly but are based on the predominating food of each period. The organisms for inoculating the ponds, are propagated throughout the winter under glass and in heated buildings. As soon as weather conditions permit in the spring, this culture is carried on out of doors, in nursery areas set aside for this purpose.

The Board of Fish Commissioners, through its Research Work, has selected species of minnows whose offspring will be of a size suitable for the baby bass to consume at the time they require them. These forage fish are propagated in large areas set aside for this purpose, and when the baby fish reach the fish feeding stage, crews of men are employed to transfer the small forage fish from these areas to the bass nurseries.

The length of time it is possible to hold the bass in the nursery ponds, before releasing them in our public waters, depends principally upon the forage crop. If troubles are encountered in propagating the forage and the supply is below normal, it will naturally have influence upon their size and the number for distribution.

Bass are very sensitive to conditions surrounding them at spawning time. Even sudden lowering of the water temperature a few degrees, will interfere with the egg laying process and may result in a total loss of the egg crop. After bass have reached the fish feeding stage, they are very voracious and will practice cannibalism even to the extent of devouring one another in the shipping cans if not carefully sorted before started on their journey to the public waters. All through their stay at the hatcheries they must be fed live natural food. The propagation of the forage crop is an enormous task in itself. Certain years disease also takes its toll for which no practical remedial measures are known.

CONSERVATION TOPICS

Live Bait Hints

A growing tendency with Pennsylvania's anglers to discard use of live bait in fishing for game fish in favor of flies and other artificial bait will benefit the supply of bass, pickerel, and wall-eyed pike in two ways. The crop of natural forage available in bass streams will not be thinned down to the detriment of game species, and a smaller number of undersize bass, pickerel, and pike perch will be injured seriously when hooked. However, wide use of live bait in bass fishing still prevails on some waters and the following hints on care of this type of lure are given with the thought of cutting down waste in a valuable source of forage.

Included in the classification of popular live bait are minnows of various species, stone catfish, helgramites, and crayfish. Minnows most widely used are the silver and golden shiners, and the run chub. Chubs are hardier as a rule and make an active bait for still fishing. Stone catfish also rank well as live bait, living for a long period of time when on the hook. The helgramite, too, is an active bait.

In keeping bait in a live box, particularly minnows and stone catfish, the first essential is to keep the box clean at all times. A fisherman may not, under the law, have more than 50 minnows or 50 stone catfish in possession at any one time. During periods of hot weather, when the water temperature of a stream is high, mortality is frequently heavy with bait fish crowded together in a live box. Before such a box is placed in use, it should be thoroughly scrubbed, and exposed to the air and sun. After bait fish have been placed in it, they should be inspected frequently, in particular if the water temperature is high. Any dead fish should be removed immediately, as they afford abundant opportunity for development of disease germs and fungus destructive to live fish.

In keeping helgramites, a highly successful method is through use of moistened grape leaves. Heat is the element to be particularly guarded against in retaining helgramites alive. If possible, they should be retained in the moist and cool atmosphere of a cellar. An abundant supply of water is not necessary. Grape leaves are eaten readily by the helgramites, and serve to keep them in good condition. The leaves should be moistened occasionally.

If present in sufficient quantity in a water supply, chlorine may prove detrimental to bait fish held in captivity. The live bait box, when placed in a stream, should be scoured frequently of the scum that may be observed to coat the interior of the box.

As a final suggestion, when fishing live bait for bass it is most beneficial to a stream to release minnows or similar forage that have not been used during the day astream. Frequently, these bait fish are in a weakened condition from carrying in a minnow pail, and an attempt to take them home may result in partial or total loss. Released in the stream, they recover rapidly and form a valuable source of forage for game fish. The fisherman, in this way, may definitely benefit angling on a favorite stream.

Boy Angler Scores

Augustus Kachel, 9, who appears in the picture, may appear a trifle proud. Every reason to be, at that, for the big brown trout he is holding, length 25 inches, weight six pounds, put up a real fight before he landed it while fishing in Allegheny Creek, Berks County. It was taken during the trout season, of course.

A number of men and boys swimming in the Schuylkill Canal, near Gibraltar, which is Augustus' home, were occupying his attention. When he glanced into the stream he saw the giant trout. Seeing a fish of that size to the average boy means action. Augustus proceeded to dog some bait, equip himself with an old pole and line, and presto, the monster was taken. What a struggle it turned out to be when the mammoth trout struck, according to Warden Bill Wounderly.

FLIES FOR BAIT OR NO FISH

Joseph Lape and Dr. Myers of Nanticoke adhere strictly to the policy "fly-fishing or no fishing." Just before the close of the trout season, while on a trip to Cross Fork Creek, in Potter County, they caught 20 brown trout, averaging a pound apiece in weight.

FIVE YEARS OLD, CASTS PLUG

Tommy Jones, Jr., of Nanticoke, all the way five years old, is an accomplished plug caster. His pet fishing water is Lake Nuangola. While casting a plug bait in the lake during the bass season, Tommy connected with and landed a fine largemouth bass, tipping the scales at five pounds.

Watersnake Incidents

W. S. Madore, secretary of the Izaak Walton League in Hyndman, Bedford County, tells of an unusual happening that illustrates the audacity of watersnakes. Emory Shaffer had caught a bass slightly over nine inches in length in Wills Creek. Placing the fish in a live net, he left it for a few minutes to fish another section of the stream. On his return he found that a watersnake had entered the net, and half swallowed the bass. Fuller Barclay and Don Goodwin, official snake hunters of the League happened along, and Don shot the snake. Lucky shot, he observed later, as it was the first snake he had killed that day.

Warden J. H. Bergman of Butler reported that he observed a large number of watersnakes while patroling the Connoquenessing Creek this summer. One snake when opened was found to contain several nice trout. The Butler Hunting and Fishing Club is offering a prize this year to the member killing the largest number of these predators. Watersnake tails in good number have been coming in during the contest.

Seth Says

Speakin' of fishing, it's pretty hard to beat one of them belted kingfishers, I reckon. Come to think of it, you don't often see 'em miss a strike. Jest the other day, I took my tackle and slipped down to the crick to ketch me a mess of suckers. As I was sittin' there I hears a chatter and along comes a big kingfisher. He no more than got to within a hundred feet of where I was sittin' when he seemed to stand still in the air for a few seconds. Then down he goes, jest like a bolt of blue feathers, that long bill aimed straight at the water. He didn't miss, no, sir. And when he starts on up creek he has a fish, sort of looked like a big chub. Not more'n a few minutes after he was gone, along comes another kingfisher. It took its perch on the limb of a tree across from where I was sittin'. Well, sir, in five minutes down it dropped, and out it came with a fish that looked like a fall-fish. Two more times, it did the same stunt, before it started on upstream. 'Twouldn't have been a hard shot to down it, if I'd had my little target rifle.

I figger that in killin' off some of these kingfishers, us fellers who like to fish will be doin' a lot of good. They ain't protected by law. About the nicest thing about 'em though, is that they're sociable cusses and pervide fair amusement when a feller is fishin'. If they was less plenty we could still have all the amusement we needed.

Yellow perch eggs are entwined on submerged logs, stumps, aquatic plants and so forth.

ED SHEESLEY, HARRISBURG, DISPLAYS A NICE CATCH OF SUCKERS

Scores Triple on Bass

From J. F. Kelly, of Ashville, a rural mail carrier, comes word of a strange incident that occurred recently while he was fishing in the Raystown Branch of the Juniata River.

"On September 30," he writes, "I was fishing the upper end of the Raystown dam at what is known as Fink's Bridge. Had fished above the bridge on the 29th and caught a bass 17¾ inches in length. At about 12 noon, I rowed across the dam and anchored. I had two rods and two lines and was using two live minnows on each line. After baiting both lines, I cast with the short rod, and had just cast with the second rod when I had a light strike on the first rod set. I let him run and hooked him, but as he seemed small I was in no particular hurry about reeling in. As I played him, however, and had brought him about half way to the boat, he began to pull a great deal harder. My first thought was that I had made a mistake in thinking the fish small. As I reeled in, I noticed my other line pulling toward the boat at the same time. When I glanced over the side of the boat, I noticed a bass on one of the lines and what appeared to be another bass following it. Imagine my surprise when I lifted in the lines to find one bass of 10½ inches, one 13½ inches, and another 13¾ inches. Here's my idea of what happened. The small bass struck first and was hooked. While I was reeling it in slowly, the second bass struck the minnow ahead of it, was hooked, and when the two made their second run, tangled in my other line with the third bass on it. It was not more than a matter of three minutes from the time I anchored the boat until I had the three bass landed.

Snapping Turtle Eats Starling; Mud Hen Hooked

Warren County's fishing waters furnished two unusual incidents last month, according to Warden R. C. Bailey. A bird-eating snapper was killed and a mud hen, dipper duck or hell-diver, call it what you wish, tested the qualities of a four-ounce fly rod.

On a recent turtle hunt, Ernest Johnson, secretary of the Brokenstraw Fish and Game Club and Fred Beckenbach, cashier of a Youngsville bank, captured a large snapping turtle.

After dressing the snapper, with the assistance of a trained nurse who was caring for Mrs. Johnson during an illness, it was decided to make an analysis of the contents of its stomach. A starling, that had apparently been eaten only a short time before, was found. It is believed that the turtle, lying in wait for prey, captured the bird when it came to the pond to drink.

Don Finley, ardent Warren sportsman, matched this strange episode when he captured the mud hen on a four-ounce fly rod. At the time of his strange catch, Don was fly fishing in the Conewango River for bass. Swooping at the lure, the mud hen took it and started for another section of the river. According to the *Times Mirror* of Warren, the bird was not injured, and after displaying his strange catch to several sportsmen, Don released it.

The call of stream and lake grows stronger with the man who likes to fish with every passing year.

Ten Wall-Eyed Pike Weigh 62 Pounds

Big wall-eyed pike, or Susquehanna salmon, were on a striking rampage in Crystal Lake, Susquehanna county, during the last week in September. A banner catch of these fine game fish, the outstanding one of the season, was made by Rev. Appleton, of Philadelphia, according to a report received from Warden Joseph Podboy of Forest City.

Trolling over a school of the giant pike, Rev. Appleton caught one weighing 10 pounds, another eight pounds, two weighing seven pounds apiece, and six tipping the scales at five pounds each. His remarkable catch was made in two days fishing. Ten Pennsylvania game fish averaging better than six pounds apiece, taken by an individual, is first-rate evidence that fishing in the Keystone State is definitely on the upgrade.

A number of other big Crystal Lake pike were taken at the same time. Myron Stanton of Carbondale landed one weighing seven pounds, while John Deitz, also of Carbondale, caught one weighing four pounds and another a six-pounder.

Four wall-eyed pike weighing 10 pounds or more have been taken from Pennsylvania waters this year.

Devise Unique Plan For Stocking Fish

Enthusiastic over the fine trout being released in waters of Luzerne County this year by the Fish Commission, sportsmen in that vicinity have been eagerly assisting in distribution of the fish, according to Russel Womelsdorf, warden, of Kingston. Apparently, they have solved a perplexing problem in stocking fish in water inaccessible by road.

"On my arrival at Stoddartsville, October 14, to meet a consignment of brown trout for the Lehigh River," writes Womelsdorf, "I found 16 men, representing different sportsmen's associations in Hazleton and White Haven, already there and waiting for the fish to arrive. They had secured permission from the Fish Commission to distribute the trout in the Lehigh River between Stoddartsville and White Haven, a distance of about ten miles. None of this section is accessible by vehicle and to my knowledge has never been stocked before. These men constructed a pontoon purposely for this occasion. It measured 16 feet in length, the bottom was covered with half-inch mesh wire screen and it was supported by rubber inner tubes and large carbide cans. Some of the men in other boats escorted the craft with its cargo of 1,600 brown trout. They also carried a camera to take moving pictures on the journey.

"How to stock this section of the Lehigh has been a subject for discussion among sportsmen here for a number of years and the problem seems to have been solved in the above manner."

Great Autumn Fishing on Delaware River

Outstanding catches of big wall-eyed pike or Susquehanna salmon are being made this autumn on the Delaware River between Milford and Bushkill, a distance of 21 miles, according to Warden Frank Brink of Milford. A checkup of catches, Frank said recently, shows that they average about five big walleyes per day for a fisherman. A number of pike weighing from four to five pounds have been caught, although no fish recently recorded have rivaled in weight the mammoth 10½-pound pike caught earlier this season on the Delaware by Joe Andrews, Cementon angler.

During autumn, trolling for wall-eyed pike is at its best, and catches of these splendid game fish made in all sections of the State during the past month, indicate that 1933 will go down in the annals of the Fish Commission as a banner season for pike fishermen.

Most of the big pike are taken by trolling in deep water. On the Delaware, the lamprey eel rates as a favorite bait for the big fellows.

BASS DIES IN ATTEMPT TO SWALLOW BULLHEAD

While patrolling Green's Pond, near Lanark recently, Warden Joel Young found a 17-inch largemouth bass floating on the surface. When he picked up the fish, Young discovered that the cause of its death was an eight-inch bullhead catfish, which had become lodged in its throat. The barbels of the catfish were firmly imbedded in the gullet of the fish, and apparently had caused its death by asphyxiation.

Friday the Thirteenth Brings Luck to Angler

It may prove a shock to those who dread the appearance of a black cat on Friday the 13th to know that Bob Norgang, of Allentown, welcomes that date for his fishing trips.

While fishing in Kistler Creek, a small tributary to the Ontelaunee Creek, on the fated 13th, Bob landed a fine 14-inch smallmouth bass from one of the small pools. A few minutes later, an 11-inch bass was added to his creel. His catch is unusual for this season of the year, owing to the fact that generally the larger bass work down into the Ontelaunee in autumn. An enthusiastic angler, Bob declared recently that his "Friday the 13th" bass were the largest he has taken from Kistler Creek, writes Warden Joel Young of Fullerton.

Striped Bass Outrival Black Bass As Killers

Striped bass, taken each year in the lower waters of the Susquehanna and Delaware rivers, rank not only as fine game fish, but in voracity equal, if not exceed, the smallmouth and largemouth bass of the inland waters. This great game fish looms as a major menace to the shad, devouring its young in immense numbers. When the shad migration is under way, the striped bass lurk in the wake of the great shad schools, following them to the spawning beds.

The rate of growth of striped bass, also known as rockfish, is amazing. Hatched in May, the young of this species will have attained a length of one inch by June, and during the first year have been known to attain a weight of five or six pounds. From the time the young have absorbed the food sac, they prey almost exclusively on other fish.

Commenting on the feeding habits of this voracious fish, Dr. C. C. Abbot says:

"A rock fish will frequently 'corner up' a small school of minnows, and then pick them up as rapidly and with as great ease as a fowl will pick grains of corn; and while devouring the luckless minnows, will keep them in a small space, close together all the time. There is no cessation of this murderous work while a fish remains, for after devouring all that it is possible for him to hold, a mere love of destruction keeps him at work. I once had a very favorable opportunity of watching the rock fish feed in this way. It was a moderate-sized fish, about a foot long, and as near as I could determine it devoured a dozen 'cyprinelles' (silver-finned minnows) in four minutes. If I err in my estimate it is on the safe side, and it may be it was 15 minnows in that length of time. I subsequently captured a dozen of these pretty shiners and I found that I could by no means squeeze them into a bulk that was not much larger than the estimated interior of a rock fish in length; and yet it is certain that the minnows captured by the rock fish were swallowed without decapitation or other reduction in size, for in that case I should have seen the fragments of the minnows floating in the clear waters."

Fishing Waters Stocked Heavily in September

EDITOR'S NOTE: *In announcing fish distribution for September, the* ANGLER *calls attention to the fact that all approved warm water and trout streams in the various counties are on the 1933 stocking list. If your favorite stream is not listed in the September distribution report, and is approved, it has either been stocked already or will be stocked later this year.*

●

DISTRIBUTION of fish and frogs to waters of the Commonwealth during September touched a peak in the autumn stocking program of the Fish Commission. Fish stocked numbered 1,446,163, including black bass, brook trout, brown trout, pickerel, yellow perch, sunfish, catfish, frogs, and minnows were released in waters in sixty counties.

Black bass released numbered 55,690; brown trout, 33,840; brook trout, 57,820; yellow perch, 4 and 5 inch, 8,325; sunfish, fingerling, 712,600; catfish, fingerling, 239,420; frogs, 335,000; and minnows, 81,300. An exceptionally fine crop of black bass was produced this year at Pleasant Mount hatchery. Bass released in September were three, four, and five inches in length on an average. Brook trout released were all over six inch legal size and many of them eight to ten inches, while a large number of nine and ten-inch brown trout were planted. All brown trout were over legal size.

Bluegill sunfish and bullhead catfish have come rapidly to the fore in popularity with the angling public and heavy distribution of these fish in suitable waters is expected to improve fishing, not only from the angle of catches but also in variety afforded the fisherman during days astream. Pickerel released were adults, averaging 12 inches in length.

With water levels up in many sections of the state, autumn stocking this year holds promise of being particularly effective. Not only does an abundant flow of water provide greater forage areas for fish, but an increase in protection from natural enemies is also assured.

Following are a list of counties stocked, and species distributed to various waters.

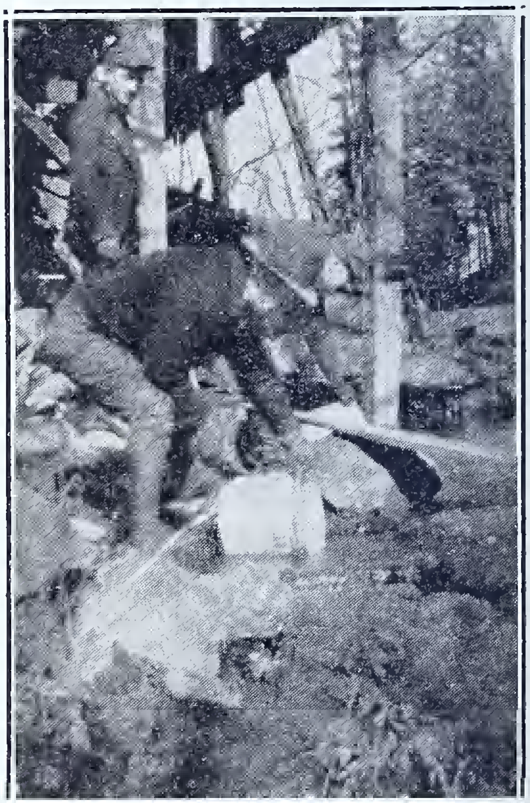
Adams—black bass, Marsh Creek, Bermudian Creek; brook trout, Conewago Creek, Conococheague Creek; sunfish, Bermudian Creek, Marsh Creek.

Armstrong—sunfish, Buffalo Creek; frogs, Buffalo Creek; catfish, Buffalo Creek.

Beaver—sunfish, Brush Creek, Little Beaver River, North Fork of Little Beaver River, Connoquenessing Creek; frogs, Brush Creek, Little Beaver River, North Fork of Little Beaver River, Connoquenessing Creek; catfish, Brush Creek, Little Beaver River, North Fork of Little Beaver River, Connoquenessing Creek.

Bedford—black bass, Raystown Branch Juniata River, Wills Creek, Bogs Creek, Dunnings Creek; brown trout, Buffalo Creek, Wills Creek, Raystown Branch Juniata River, Cumberland Valley Run; brook trout, Buffalo Creek, Yellow Creek; sunfish, Dunnings Creek, Bobs Creek, Wills Creek, Lake Gordon, Thomas W. Coon Lake, Woodbury Dam, Raystown Branch Juniata River, Brush Creek; frogs, Lake Gordon, Thomas W. Coon Lake, Woodbury Dam, Raystown Branch Juniata River, Brush Creek; catfish, Lake Gordon, Thomas W. Coon Lake, Woodbury Dam, Raystown Branch Juniata River, Brush Creek.

Berks—black bass, Maiden Creek, Monocacy Creek, Manatawney Creek; brook trout, Pine Creek, West Branch Perkiomen Creek; sunfish, Manatawney Creek, Monocacy Creek, Maiden Creek.



TROUT STOCKING WAS A FEATURE IN SEPTEMBER DISTRIBUTION

Blair—black bass, Frankstown Branch Juniata River, Williamsburg Dam on Frankstown Branch Juniata River; brown trout, Piney Creek, Frankstown Branch Juniata River; brook trout, Bald Eagle Creek, Canoe Creek; sunfish, Stevens Dam on Sinking Creek, Brush Run, Frankstown Branch Juniata River, Williamsburg Dam on Frankstown Branch Juniata River; frogs, Stevens Dam on Sinking Creek, Brush Run, Frankstown Branch Juniata River; catfish, Stevens Dam on Sinking Creek, Brush Run, Frankstown Branch Juniata River.

Bradford—black bass, Sugar Creek; yellow perch, Sugar Creek; sunfish, Sugar Creek, Rockwell Pond, Mountain Lake, Herrickville Rod and Gun Club; minnows, Mountain Lake; catfish, Mountain Lake, Herrickville Rod and Gun Club Pond, Rockwell Pond, Sugar Creek.

Bucks—black bass, Tohickon Creek, Little Neshaminy Creek.

Butler—sunfish, Wolf Creek, Bhuls Channel, Breakneck Creek, Harmony Junction Reservoir, Yellow Creek, Connoquenessing Creek, Glade Run, Thorn Creek; frogs, Wolf Creek, Thorn Creek, Connoquenessing Creek, Bhuls Channel, Breakneck Creek, Harmony Junction Reservoir, Yellow Creek, Glade Run; catfish, Wolf Creek, Thorn Creek, Connoquenessing Creek, Bhuls Channel, Breakneck Creek, Harmony Junction Reservoir, Yellow Creek, Glade Run.

Cambria—brown trout, Clearfield Creek, Chest Creek; brook trout, Beaver Dam Run; sunfish, Beaver Dam Run, Dooman Dam, Davis Run; frogs, Dooman Dam, Davis Run, Beaver Dam Run; catfish, Dooman Dam, Davis Run, Beaver Dam Run.

Cameron — brook trout, Sinnemahoning Portage Creek, Clear Creek; sunfish, Devling Pond, Bowers Pond, Mix Run Pond; catfish, Devling Pond, Bowers Pond, Mix Run Pond; frogs, Devling Pond, Bowers Pond, Mix Run Pond.

Carbon—brown trout, Pohopoco Creek; brook trout, James Run.

Centre—brook trout, White Deer Creek, Pine Creek, Synagogue Stream, Penns Creek, Cherry Run, Elk Creek, McBridges Gap Run, Little Fishing Creek, Little Moshannon Creek; brown trout, Spring Creek, Penns Creek, Bald Eagle Creek; yellow perch, Little Black Moshannon Creek; minnows, Little Black Moshannon Creek; sunfish, Penns Creek, Sinking Creek, Bald Eagle Creek; catfish, Penns Creek, Sinking Creek, Bald Eagle Creek; frogs, Penns Creek, Sinking Creek, Bald Eagle Creek.

Chester—black bass, East Branch Octoraro Creek, West Branch Brandywine Creek, French Creek; sunfish, French Creek, West Branch Brandywine Creek, East Branch Octoraro Creek.

Clarion—black bass, Allegheny River; sunfish, Red Bank Creek, Licking Creek, Allegheny River, Huefner Dam, Clarion River; frogs, Red Bank Creek, Licking Creek, Allegheny River, Huefner Dam, Clarion River; catfish, Red Bank Creek, Licking Creek, Allegheny River, Huefner Dam, Clarion River.

Clearfield—brook trout, Montgomery Creek, Mosquito Creek, Moshannon Creek, Mountain Run, Fork Run; brown trout, Lick Run, Mosquito Run; sunfish, Helveta Dam, Tannery Dam Creek, Sabula Dam, Little Clearfield Branch, Chest Creek, Sandy Lick Creek; catfish, Tannery Dam, Helveta Dam, Sandy Lick Creek, Little Clearfield Creek, Chest Creek; frogs, Tannery Dam, Sandy Lick Creek, Helveta Dam, Little Clearfield Creek, Chest Creek.

Clinton—brown trout, Big Fishing Creek, Rouchs Creek; brook trout, Lick Run, Right Branch Young Womans Creek, Birch Island Run, Swamp Branch of Big Run, Middle Branch of Big Run, Big Run, Hammersley Fork Creek, Big Fishing Creek; sunfish, Pine Creek, Bald Eagle Creek, Bald Eagle Canal; catfish, Pine Creek, Bald Eagle Creek, Bald Eagle Canal; frogs, Bald Eagle Canal, Pine Creek, Bald Eagle Creek.

Columbia—black bass, Fishing Creek; brook trout, West Branch Fishing Creek, Coles Creek; brown trout, Fishing Creek; sunfish, Fishing Creek.

AN ATTENDANT CHECKS EIGHTY CANS OF FISH, READY FOR THEIR TRIP TO PUBLIC WATERS IN ONE OF THE FISH COMMISSION'S TRUCKS

Crawford—sunfish, Sugar Lake, Clear Lake, Canadohta Lake, Cussewago Creek, Oil Creek, Crooked Creek, French Creek; catfish, Oil Creek, Crooked Creek, French Creek, Sugar Lake, Cussewago Creek; frogs, French Creek, Sugar Lake, Clear Lake, Canadohta Lake, Cussewago Creek, Oil Creek, Crooked Creek.

Cumberland—black bass, Yellow Breeches Creek; brook trout, Mountain Creek, Cockleys Run, Alexandria Spring Run or Lines Run, Mt. Rock Run, Hogestown Run, Big Springs Run; sunfish, Yellow Breeches Creek

Delaware—black bass, Chester Creek, Darby Creek; sunfish, Darby Creek, Chester Creek; brown trout, Ridley Creek.

Elk—black bass, Spring Creek; brook trout, Bear Creek, Maxwell Run, Big Run; sunfish, Game Refuge Pond, Straight Creek Pond, Black Swamp Pond, Indian Run Pond, Water Reservoir Ridgway, Becks Pond; catfish, Game Refuge Pond, Straight Creek Pond, Black Swamp Pond, Indian Run Pond, Water Reservoir Big Mill Creek, Becks Pond; frogs, Black Swamp Pond, Indian Run Dam, Ridgway Water Reservoir, Becks Pond, Game Refuge Pond, Straight Creek Pond.

Erie—black bass, French Creek, West Branch French Creek, South Branch French Creek; sunfish, Edinboro Lake, Conneaut Creek, Elk Creek, Runion Creek, Elk Park Dam; catfish, Conneaut Creek, Elk Park Dam, Elk Creek, Runion Creek, Edinboro Lake; frogs, Elk Creek, Runion Creek, Edinboro Lake, Conneaut Creek.

Forest—sunfish, Allegheny River; catfish, Allegheny River; frogs, Allegheny River.

Franklin—black bass, Conococheague Creek, Conodoguinet Creek; brook trout, Conococheague Creek, East Branch Little Antietam Creek, Dennis Creek, Piuola Run, Trout Run, Broad Run, Carbaugh Run, Red Run; sunfish, Conodoguinet Creek, Conococheague Creek, West Branch Conococheague Creek, Goods Dam on East Branch Little Antietam Creek, East Branch Little Antietam Creek, Indian Lake; catfish, Goods Dam on East Branch Little Antietam Creek, East Branch Little Antietam Creek, Indian Lake; frogs, West Branch Conococheague Creek, Goods Dam on East Branch Little Antietam Creek, East Branch Little Antietam Creek, Indian Lake.

Fulton—brook trout, Little Aughwick Creek; sunfish, Cove Creek, Licking Creek; catfish, Cove Creek, Licking Creek; frogs, Cove Creek, Licking Creek.

Greene—black bass, South Fork Dunkard Fork of Wheeling Creek, North Fork Dunkard Fork of Wheeling Creek, Dunkard Fork of Wheeling Creek, Enslow Fork Creek, Wheeling Creek; sunfish, Muddy Creek, Dunkard Creek, Penna. Fork of Fish Creek, South Fork of Ten Mile Creek, Browns Fork Creek, Whitley Creek; catfish, Muddy Creek, Dunkard Creek, Penna. Fork of Fish Creek, South Fork of Ten Mile Creek, Browns Fork Creek or Browns Creek, Whitley Creek; frogs, Muddy Creek, Dunkard Creek, Penna. Fork of Fish Creek, South Fork of Ten Mile Creek, Browns Fork Creek, Whitley Creek.

Huntingdon—black bass, Penn Central Dam on Raystown Branch Juniata River, Frankstown Branch Juniata River, Penn Central Dam on Frankstown Branch Juniata River, Raystown Branch Juniata River, Juniata River; brook trout, Laurel Run, Standing Stone Creek; yellow perch, Juniata River; sunfish, Penn Central Dam on Frankstown Branch Juniata River, Frankstown Branch Juniata River, Raystown Branch Juniata River, Penn Central Dam on Raystown Branch Juniata River, Williamsburg Dam on Frankstown Branch Juniata River, Aughwick Creek, Sideling Hill Creek; catfish, Raystown Branch Juniata River, Penn Central Dam on Raystown Branch Juniata River, Williamsburg Dam on Frankstown Branch Juniata River, Penn Central Dam on Frankstown Branch Juniata River, Aughwick Creek, Sideling Hill Creek; frogs, Raystown Branch Juniata River, Penn Central Dam on Raystown Branch Juniata River, Williamsburg Dam on Frankstown Branch Juniata River, Penn Central Dam on Frankstown Branch Juniata River, Aughwick Creek, Sideling Hill Creek; minnows, Juniata River.

Indiana—brook trout, Little Yellow Creek; sunfish, Little Mahoning Creek, Yellow Creek; catfish, Little Mahoning Creek, Yellow Creek; frogs, Little Mahoning Creek, Yellow Creek.

Jefferson—black bass, Little Sandy Creek; brook trout, North Fork Red Bank Creek, Manners Run; sunfish, Reeds Dam, Little Sandy Creek, Sandy Lick Creek, Red Bank Creek; catfish, Sandy Lick Creek, Reeds

(Continued on Page 14)

LAKE WALLENPAUPACK, WHERE GREAT AUTUMN FISHING IS REPORTED

Lightning Strikes—Kills Hatchery Fish

Those who hide their head beneath the bed pillows during an electric storm and envy the calm security of the fish swimming far beneath the water's surface are being disillusioned by Phil G. Zalsman, superintendent of the Grayling State Fish Hatchery.

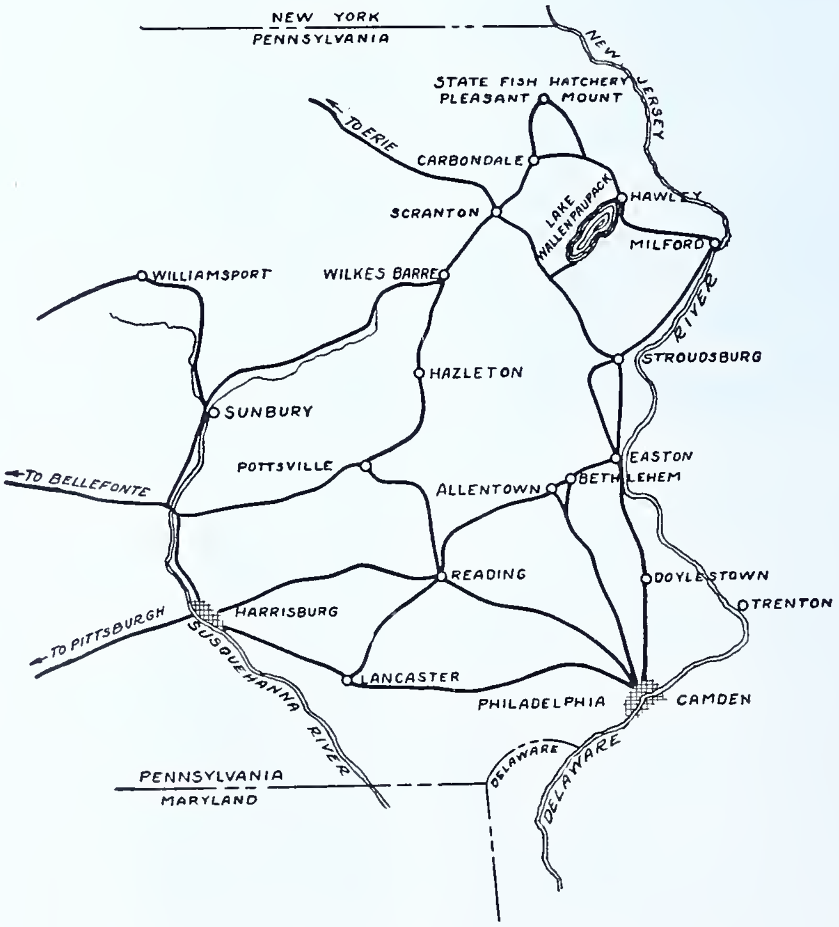
Zalsman has reported to the Conservation Department that a bolt of lightning struck 25 brook trout in one of his hatchery ponds. It is the first authentic report ever received by the Department of death of fish from that source.

A bolt of lightning struck a hatchery pond early in the morning, Zalsman reported. By noon he had picked up 25 trout that had been stricken. Only three survived the shock. The skin of one of the trout was entirely stripped off by the bolt. Others were burned from head to tail.

There is no reason to suppose that fish are not frequently killed by lightning, the Fish Division said, but it is difficult to prove the real cause of death in such instances. The fact that hundreds of other fish in the same pond were not injured would indicate that ordinarily the fish mortality rate from lightning is not high.

(Courtesy—*Michigan Sportsman*).

Two and one-half hours' fishing on Wallenpaupack yielded a catch of 15 bass to Milt Harris and Elwood Gimble, of Reading, and Fred Singer, who lives at the lake. The largest bass weighed four and one-half pounds.



AUTOMOBILE ROUTES TO LAKE WALLENPAUPACK

Dead Bullhead Scores a Kill

When recently a giant wall-eyed pike plunged from the surface of Lake LeBoeuf, Erie County, time and again, C. A. Comer of Waterford who was fishing nearby, investigated. With each contortion on the surface, the pike appeared weaker. Finally, its convulsions became spasmodic as it rolled about, and Comer lifted it into the boat.

Its barbels imbedded in the throat of the pike, a large bullhead catfish was found. After killing the catfish, it had apparently attempted to swallow its victim tail first, with disastrous results. The wall-eyed pike died within a very short time of being lifted into the boat. It weighed nine pounds, according to Warden W. E. Briggs of Waterford, who reported the incident.

Fishing Yesterdays

Larger brown trout have been taken in Pennsylvania this year than were caught in 1905. A brook trout weighing three pounds caught this year tops in weight any reported to the Fish Commission in 1905. Pennsylvania fishermen were then alarmed at the decrease in number of bass. These interesting facts, gleaned from a report of the Fish Commission for 1905, turn back the pages to yesterday's fishing in the Keystone State. Following are excerpts that should be of interest to anglers who consistently say that fishing "isn't what it used to be."

Trout in 1905

"As far as ascertained, the heaviest fish taken by rod, hook, and line was probably from Gordon Run in Crawford County. It is reported to have weighed five pounds and 14 ounces. It was probably not a brook trout but a California (brown) trout. The fish was caught the latter part of April. On the 28th of the same month there was caught from Pine Creek, Lycoming County, a brook trout which weighed two pounds, nine ounces. Early in June there was caught from the same stream near Blackwells, Tioga County, a brown trout which measured 21½ inches in length and had a weight of four pounds. The fortunate angler on this occasion only caught two other fish, but these two weighed a little over three pounds, his three fish, therefore, weighed a litle over seven pounds, and he caught them with a three-ounce rod and No. 16 hook (fly).

"Centre County has long been known for large fish, and every year some huge specimens are captured from its waters. On April 28th, a brown trout of 23 inches was caught from Spring Creek at Bellefonte, and on July 8th, a Lewistown angler captured a brown trout of 25½ inches from the same stream and within 200 yards of the spot where the other brown trout was caught. The fish weighed five and one-half pounds.

"The opening day for trout (then April 1) was exceedingly disagreeable, the weather in the morning was clear but cold and very few trout came to the fly. The several thousand fish which were caught were mostly taken with worms. For two or three succeeding days snow fell in nearly every quarter where trout congregated and in some instances the cold was so intense that anglers had to stop every few minutes to clear the ice from the guides on their rods so that the line would run through freely."

Bass in 1905

"A reference to the reports of the Fish Commission and the Department of Fisheries and to papers read before the State Fisheries Association will show that for the last four or five years there has been an alarming decrease noted in the number of black bass in the waters of Pennsylvania. The decrease was not confined to one locality but seemed to be general throughout the State, with few exceptions.

"Following these reports we find that the decrease was not merely in the catch of legal size fish, but what was far more important there was noted a marked decrease in the number of smaller fish and of newly-hatched fish. By 1904 many streams formerly noted for the abundance of black bass were reported to be almost barren of this great game fish. It was said in 1904 that far more wall-eyed pike, commonly called Susquehanna salmon, were captured from the Susquehanna River than black bass.

"Points like Peach Bottom, Fites Eddy, Bald Friars and Cove, in former years famous as fishing resorts, were declared to be absolute failures. Pine Creek, a tributary of the Susquehanna, formerly well known in the northern part of Pennsylvania as a great bass stream for many miles above its mouth, was said to be almost entirely barren of bass. The Delaware River, its tributaries—the Schuylkill, Brandywine, and Darby, all were said to be in the same deplorable conditions.

"One cause assigned was a widespread disregard for the laws prohibiting spearing and netting. The people who heard of this theory declared that during the spawning season the gigger would pole his boat to a spawning bed and wait for a few minutes until the frightened fish had returned, when it was easily speared, destroying thousands of eggs. In this manner, they accounted for the almost total absence of newly-hatched fish. The decrease in number of larger fish they attributed to the illegal netter."

HEWITT DAM AT SPRING CREEK COMPLETED RECENTLY

TO ANGLER READERS

As the October issue of PENNSYLVANIA ANGLER did not reach readers now on the mailing list until late in the month, the November number is being sent out as a final trial copy. If you desire to continue to receive this publication, State requirements necessitate a subscription fee of fifty cents ($.50) a year in advance. The present mailing list will be revised this month to include only individuals who have forwarded the necessary subscription fee. Subscriptions will start with the December issue.

SUBSCRIPTION BLANK

Enclosed find fifty cents ($.50) for one year's subscription to PENNSYLVANIA ANGLER, starting with the December number.

NAME ....
(Print Name)
STREET AND NUMBER ....
CITY ....

Please indicate in what form money is sent, whether check or money order. Stamps not acceptable. Check or money order should be made payable to the Commonwealth of Pennsylvania.

Fishing Waters Stocked

(Continued from Page 11)

Dam, Red Bank Creek; frogs, Red Bank Creek, Reeds Dam, Sandy Lick Creek.

Juniata—black bass, Juniata River, Pomeroy's Dam on Tuscarora Creek, Tuscarora Creek; sunfish, Pomeroy's Dam on Tuscarora Creek, Tuscarora Creek.

Lackawanna — sunfish, Mountain Lake, Sicklers Pond, Lake Sheridan, Newton Lake, Crystal Lake, Hear Lake, Chapman Lake, Handsome Lake, Ford Pond, Baylors Pond; catfish, Mountain Lake, Heart Lake, Chapman Lake, Newton Lake, Crystal Lake, Sicklers Pond, Lake Sheridan, Baylors Pond, Ford Pond, Handsome Lake; yellow perch, Mountain Lake; minnows, Handsome Lake, Ford Pond, Baylors Pond, Sicklers Pond, Chapman Lake, Crystal Lake, Newton Lake.

Lancaster—black bass, Big Chickies Creek, Conowingo Dam, Conestoga Creek, Cocalico Creek, Muddy Creek, Octoraro Creek; brook trout, Little Conestoga Creek, Swarr Run, Hammer Creek, Donegal Creek, Gladfelters Run, Middle Creek, Unicorn Creek, Seglog Creek, Rock Run; sunfish, Big Chickies Creek, Conowingo Creek, Octoraro Creek, Muddy Creek, Cocalico Creek, Conestoga Creek.

Lawrence—sunfish, Cement Dam, Shenango River, Neshannock Creek, Power House Dam, Youngstown Quarry Pool, Carbon Quarry Pool, Connoquenessing Creek, Clarks Pond, Hottenbaugh Creek, Pond at New Castle Golf Course, Slippery Rock Creek; catfish, Connoquenessing Creek, Lower Power House Dam, Youngstown Quarry Pool, Carbon Quarry Pool, Connoquenessing Creek, Clarks Pond, Hottenbaugh Creek, pond at New Castle Golf Course, Slippery Rock Creek; catfish, Connoquenessing Creek, Lower Power House Dam, Youngstown Quarry Pool, Carbon Quarry Pool, Neshannock Creek, Shenango River, Slippery Rock Creek, Cement Dam, Clarks Pond, Hottenbaugh Creek, Mill Creek; frogs, Slippery Rock Creek, Clarks Pond, Hottenbaugh Creek, Cement Dam, Shenango River, Neshannock Creek, Elliotts Run, Lower Power House Dam, Youngstown Quarry Pool, Carbon Quarry Pool, Conoquenessing Creek.

Lehigh—brown trout, Little Lehigh River; brook trout, Little Lehigh River.

Luzerne—black bass, North Branch Susquehanna River; pickerel, Nuangola Lake; brown trout, Huntingdon Creek, Lehigh River, Wapwallopen Creek, Kitchen Creek; sunfish, North Branch Susquehanna River, Nuangola Lake, Harvey Lake; catfish, Harvey Lake, West Branch Susquehanna River, Nuangola Lake; minnows, North Branch Susquehanna River, Harvey Lake.

Lycoming—black bass, Loyalsock Creek, Lycoming Creek, Muncy Creek; brook trout, Pleasant Stream, Hogland Run, White Deer Hole Creek, Muncy Creek; brown trout, Lycoming Creek, Larrys Creek; sunfish, Lycoming Creek, Loyalsock Creek, Muncy Creek, Pine Creek, Mill Creek, Little Muncy Creek, Highland Lake; catfish, Muncy Creek, Lycoming Creek, Loyalsock Creek, Little Muncy Creek, Highland Lake, Pine Creek; frogs, Pine Creek, Lycoming Creek, Mill Creek, Muncy Creek, Loyalsock Creek, Little Muncy Creek, Highland Lake.

DUNNING'S CREEK, BEDFORD COUNTY, WAS STOCKED IN ITS LOWER WATERS WITH BASS AND SUNFISH DURING SEPTEMBER

McKean—brook trout, Kinzua Creek; sunfish, Hamlin Lake, Mellander Pond, Kushequa Pond; catfish, Mellander Pond, Kushequa Pond, Hamlin Lake; frogs, Mellander Pond, Kushequa Pond, Hamlin Lake.

Mercer—sunfish, Sandy Lake, Neshannock Creek, Little Shenango River, Wolf Creek; catfish, Wolf Creek, Neshannock Creek, Little Shenango River; frogs, Wolf Creek, Sandy Lake, Neshannock Creek, Little Shenango River.

Mifflin—black bass, Juniata Country Club Dam, Juniata River; brook trout, Treaster Valley Run, East Branch Kishacoquillas Creek, West Branch Kishacoquillas Creek, Laurel Run; brown trout, Penns Creek, Long Meadow Run; sunfish, Juniata Country Club Dam on Juniata River, Juniata River, Jack's Creek; catfish, Juniata Country Club Dam on Juniata River, Juniata River, Jack's Creek; frogs, Juniata Country Club Dam on Juniata River, Juniata River, Jack's Creek.

Monroe—brook trout, Big Bushkill Creek, Aquashicola Creek, Pocono Creek, Pohopoco Creek; sunfish, Gregory Ice Pond, Deep Lake; catfish, Gregory Ice Pond, Deep Lake.

Montgomery — black bass, Manatawney Creek; sunfish, Mantawney Creek; minnows, Manatawney Creek.

Northampton—brook trout, Monocacy Creek, Saucon Creek, Bushkill Creek.

Perry—black bass, Juniata River, Sherman's Creek; sunfish, Sherman's Creek.

Pike—pickerel, Promise Land Pond, Pecks Pond, Lake Wallenpaupack; yellow perch, Twin Lakes, Ecks Pond; sunfish, Panther Lake, Welcome Lake, Lake Wallenpaupack, Twin Lakes, Bruce Lake, Ecks Pond, Pecks Pond, Promise Land Pond; catfish, Promise Land Pond, Pecks Pond, Lake Wallenpaupack, Twin Lakes, Panther Pond, Ecks Pond, Bruce Lake, Welcome Lake; minnows, Welcome Lake, Panther Pond, Lake Wallenpaupack, Twin Lakes, Promise Land Pond, Pecks Pond.

Potter—brook trout, East Fork of First Fork of Sinnemahoning Creek, Luddington Branch of Genesee River, Eleven Mile Run; brown trout, Kettle Creek.

Schuylkill—brook trout, Deep Creek, Sugar Loaf Run, Bear Creek.

Snyder—black bass, North Branch Middle Creek, Middle Creek, Penns Creek; brook trout, North Branch Mahantongo Creek; sunfish, Penns Creek, Middle Creek, North Branch of Middle Creek, P. P. & L. Co. Dam on Middle Creek, Freeburg Fire Pond No. 1, Freeburg Fire Pond No. 2; catfish, Middle Creek, P. P. L. Dam on Middle Creek, Freeburg Fire Pond No. 2, North Branch Middle Creek, Freeburg Fire Pond No. 1.

Somerset — brown trout, Wills Creek, Laurel Hill Creek; brook trout, Clear Shade Creek, Whites Creek, Piney Run.

Sullivan—brook trout, Pigeon Creek, Rocky Run, Muncy Creek; sunfish, Eagles Mere Lake; catfish, Eagles Mere Lake; minnows, Eagles Mere Lake.

Susquehanna—pickerel, Wrighters Lake; sunfish, Pages Pond, East Lake, Comforts Pond, Wrighters Lake; catfish, Wrighters Lake, Comforts Pond, East Lake, Pages Pond; minnows, East Lake.

Tioga—brook trout, Tioga River, Cedar Run, Kettle Creek.

Union—black bass, Penns Creek, Buffalo Creek; brook trout, White Deer Creek; sunfish, Penns Creek, Buffalo Creek.

Venango—black bass, Allegheny River; sunfish, French Creek, Polk State Sanitarium Dam, Allegheny River; catfish, Allegheny River, French Creek, State Sanitarium Dam at Polk; frogs, French Creek, State Sanitarium Dam at Polk, Allegheny River.

Warren—black bass, Brokenstraw Creek; sunfish, Brokenstraw Creek, Allegheny River, Conowango Creek, Penn Avenue Dam; catfish, Conowango Creek, Penn Avenue Dam, Brokenstraw Creek, Allegheny River; frogs, Penn Avenue Dam, Conowango Creek; Brokenstraw Creek, Allegheny River.

Washington—sunfish, Buffalo Creek, Ten Mile Creek, Krewers Dam, Laughloth Mill Dam, Harmon Creek Coal Company Dam, Aunt Clara Fork of Kings Creek, Kings Creek; catfish, Buffalo Creek, Ten Mile Creek, Krewers Dam, Laughloth Mill Dam, Harmon Creek Coal Company Dam, Cross Creek, Aunt Clara Fork of Kings Creek, Kings Creek; frogs, Buffalo Creek, Ten Mile Creek, Krewers Dam, Laughloth Mill Dam, Harmon Creek Coal Company Dam, Cross Creek, Kings Creek, Aunt Clara Fork of Kings Creek.

Wayne—pickerel, Hiawatha Lake, Shehawken Lake, Lake Sheridan, Island Lake, Coxton Lake, Duck Harbor Pond, Lake Henry; sunfish, Starlight Lake, Hiawatha Lake, Shehawken Lake, Perch Pond, Long Pond, North Jersey Lake, Gouldsboro Ice Pond, Galilee Pond, Spruce Lake, Freethy Pond, Rose Pond, Adams Lake, Elk Lake, Lake Ladore, Lake Como, Sly Lake, High Lake, Lower Woods Pond, Beach Lake, Long Pond, Coxton Lake, Island Lake, Goose Pond, Independent Lake, White Oak Pond, Bone Pond, Poyntelle Lake, Big Hickory Lake, Spruce Lake, Duck Harbor Pond, Lake Henry; catfish, Galilee Pond, Spruce Lake, Freethy Pond, Rose Pond, North Jersey Lake, Gouldsboro Ice Pond, Long Pond, High Lake, Sly Lake, Lake Como, Beach Lake, Lower Woods Pond, Goose Pond, Duck Harbor Pond, Bone Pond, Spruce Lake, Big Hickory Lake. Poyntelle Lake, White Oak Pond, Independent Lake, Island Lake, Coxton Lake, Lake Henry, Starlight Lake, Hiawatha Lake, Shehawken Lake, Perch Pond, Adams Lake, Elk Lake, Lake Ladore; minnows, Perch Pond, Shehawken Lake, Hiawatha Lake, Rose Pond, Elk Lake, Lake Ladore, North Jersey Lake, Gouldsboro Ice Pond, Beach Lake, Long Pond, Island Lake, Coxton Lake, Goose Pond, Duck Harbor Pond, Lower Woods Pond, Lake Henry.

Westmoreland—brown trout, Tub Mill Run; brook trout, Baldwin Run, Powder Mill Run, Shannon Run, Linn Run, Mill Creek, South Fork Mill Creek, North Fork Mill Creek; sunfish, St. Vincents Lake, Four Mile Run; catfish, Four Mile Run; frogs, Four mile Run.

Wyoming — sunfish, Chamberland Pond, Nigger Pond, Edinger Pond; catfish, Chamberland Pond, Nigger Pond, Edinger Pond.

York—brook trout, Orson Run, Toms Run, Otter Creek, Fishing Creek, Leibs Creek.

ONE-ARMED ANGLER MAKES CATCH

Five fine smallmouth bass were taken recently from the Aughwick Creek by F. S. Hetrick, one-armed constable of Bellwood. Constable Hetrick is a skilful fisherman and each year scores nice catches, according to Warden Lincoln Lender of Bellwood.

In extracting a fish hook from the hand or other parts of the body, push the point on through as near the place where it went in as is possible, and cauterize the wound at once with a good antiseptic. Don't pull the hook back.

Fine Trout Waters Opened

Through construction of fifteen miles of road in Gaines and Elk Townships, Tioga county, trout fishermen will have easy access to some of the finest trout waters on the North Tier next spring. The road, completed last spring, was constructed by the Department of Forests and Waters as a safeguard against forest fires. Its chief value, from a fisherman's standpoint, is that it will furnish a direct route from the Roosevelt Highway to the headwaters of a number of Lycoming county's best trout streams.

This road leads from Rexford on Route 6 through fifteen miles of fine forest land to a deserted mill town near the headwaters of Cedar Run. Cedar Run is large enough to provide plenty of food and cover for its fish, and is well stocked with brook and brown trout.

From the mill town, Leetonia, another road follows Frying Pan Run and leads to the Francis Branch of Slate Run. Famed for its brown trout fishing. Slate Run ranks with the best in the state. It is a large stream that flows about eight miles through Lycoming County, and should furnish fine brown trout fishing next season. Several hunters reported last year that they had never seen so many large trout on the spawning beds as they did in Slate Run.

A great trip for any fisherman next spring would be a drive over this new road to Leetonia and then to Slate Run. Fine brook trout fishing could be had in the morning in some of the larger branches, and in the afternoon and evening the big brown trout could be tackled. Pine Creek, Painter Run, Four Mile Run, and other streams difficult of access before the building of the road are now easily accessible.

CATCHES FIVE-POUND BASS

One of the finest smallmouth bass taken from the Juniata River this year was caught recently by Charles Figard of Bellwood, according to Warden Link Lender. Figard was fishing near Newton Hamilton when he caught a bass weighing five pounds.

BUILD DAMS

Assisted by workers from C. C. C. camp number 59, in Huntingdon County, Warden Link Lender of Bellwood recently installed 41 small dams on Detweiler Run, a trout stream in Huntingdon County.

Bass in Artificial Reservoirs

(Continued from Page 5)

thrive and reproduce year after year in spite of the most persistent fishing. It is remarkable the number of good bass that a comparatively small body of water produces annually. Of course, they won't always strike, and I suspect that many of the larger ones know intimately about every type of lure—which probably accounts for their ability to withstand the hard fishing. But as long as the fishermen knows that there are good ones in the water, his interest in fishing is maintained.

Lebanon Waters Stocked Heavily

Fishermen in Lebanon County should have splendid fishing for bluegill sunfish and catfish next season following heavy stocking of these popular species, according to Warden Frank Sanda of Steelton. Sanda, assisted by J. W. Brand, secretary of the Lebanon County Fish and Game Protective Association, and Amos Geistwhite, helped to stock Greble's, Freeport, and Mecks dams, on the Little Swatara, Strack's dam, north of Myerstown, Annville Water Works dam, Staver's dam, and Kiawinis dam near Lebanon, and Coalbrook dam on the Conewago Creek with bullhead catfish ranging in size from six and one-half to nine inches and bluegill sunfish fingerlings.

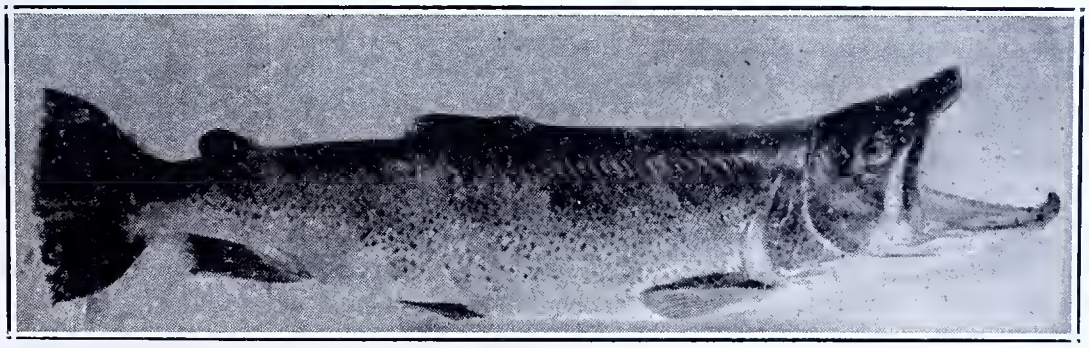
Stunned, Perhaps, But Not "Out"

John Lookatch and Early Aley of Galeton vouch for this episode submitted by Warden Dewey Grant of Galeton. It concerns one of Pine Creek's famous big trout, and it happened when the trout season was in full swing.

The Galeton anglers were fishing in a pool inhabited by a brown trout reputedly two feet long or over. It was just the right time in the evening to expect a strike. Suddenly their attention was drawn to a commotion in the shallow water at the head of the pool. A big fish was threshing about in the shallows, apparently in pursuit of a terror-stricken minnow. As both fishermen were using minnows for bait, they momentarily expected a response from the big fellow, after the water had calmed down where it had been feeding.

Lookatch a few minutes later observed a big fish floating downstream, and pointed it out to Aley. It was undoubtedly the monarch of the pool. Its only movements were a few feeble twitches, and it was gasping as though in distress as it floated by. Aley touched it with his foot. In a flash, it came to life and darted to deep water.

The theory is advanced that in some way, while pursuing the minnow in shallow water, it had struck a rock, temporarily stunning itself.



THIS BROWN TROUT WAS 31 INCHES IN LENGTH AND WEIGHED NINE POUNDS. NOTE THE LONG. HOOKED JAWS CHARACTERISTIC OF OLD SPECIMENS OF THE BROWN TROUT SPECIES

HERE AND THERE IN ANGLERDOM

October Bass

Central Pennsylvania anglers look forward to autumn fishing as the time of season when the big fellows come to creel. Bass waters in Cumberland and Perry counties, the famous Condoguinet in Cumberland County, and Sherman's Creek, ace fishing stream in Perry, are living up to pre-season predictions of catches of large bass. October angling yielded some real prizes. George James, warden at Carlisle, reported the catches.

While trying his luck on the Conodoguinet at Rolling Hill on the 14th, Robert Zearing of Balfour, caught a smallmouth bass weighing three and one half pounds. A crayfish was used as bait. Bruce Flegal of Carlisle caught a beautiful specimen of the smallmouth clan at Good Hope Mill on a crayfish. His catch tipped the scales at three pounds, 11 ounces, and was made on the 19th. A smallmouth weighing four pounds, one ounce, was taken in the Conodoguinet at Balfour on a helgramite by John Cuff, Carlisle. William Brehm of Carlisle landed a four-pounder while fishing at Pine Hill on the Conodoguinet. Brehm's catch, like a number of others, was made on a crab or crayfish, and evidently this type of live bait is an ace lure this season.

Sherman's Creek at Dunkelberger's in Perry County yielded a fine four-pound smallmouth bass to Arthur Armstrong of Carlisle. Armstrong made his catch on a large minnow.

Fishing below the dam at York Haven on the Susquehanna River recently, Charles Brother and his son Paul made a splendid catch of wall-eyed pike or Susquehanna salmon. The largest wall-eye weighed five pounds, two ounces, and was 25 inches in length. Runner-up to it in size was a pike-perch weighing almost five pounds. Seven other pike in the catch ranged in length from 15 to 18 inches and averaged one and a quarter pounds in weight. On the morning following the catch, two 18-inch wall-eyes were taken. Stone catfish were used as bait, and the fish were all taken while still fishing.

Troublesome Hook

Henry Wingard, son of the refuge keeper on Penn's Creek, noticed a large brown trout struggling about on the surface of the stream. After catching it, according to Warden Art Snyder of Mifflinburg, Wingard found a small hook embedded in its back. The trout measured 20½ inches in length.

A CONNEAUT LAKE MUSKIE
LENGTH, 47 INCHES, WEIGHT, 26 POUNDS. CAUGHT RECENTLY BY CHARLES McCRIGHT. JOE CANNON, STANDING BESIDE IT, IS 6 FEET ONE INCH IN HEIGHT

A number of waterdogs or hell-benders were caught at Pomeroy's dam on Tuscarora Creek this summer, according to Warden C. V. Long, East Waterford. When an examination of the stomach contents of one of the salamanders was made, it was found to contain fish ranging in length from three and one quarter to four inches. One of the fish was a sucker, and the others could not be identified as they were partially digested.

Shooting watersnakes with a muzzle-loading shotgun is a first rate method of snake control, if you ask Calvin Croft of Waterside. Warden Link Lender reported during the summer that Croft has killed 15 watersnakes on Potter Creek in front of his house.

Old timers at fishing Lake Gordon, famous largemouth bass water in Bedford County, are of the opinion that catches of bass and other fish from the lake were better this year than at any time in the past. An abundance of natural food for bass and wall-eyed pike assures consistently good bass fishing in this popular lake next year.

Pickerel spawn in March and April.

Kill Copperhead Snake Swimming Across Stream

Observing a snake swimming the Raystown Branch while they were patroling recently, Wardens Lender and Keebaugh approached it to within shooting distance. They had seen the snake enter the water from the opposite shore, and Keebaugh opened fire on it with his pistol. A well-placed shot cut the reptile in half, and investigation revealed it to be a large copperhead snake.

Columbia anglers are having good fishing in the Susquehanna this autumn. Gordon Wilson, mail carrier, recently landed a smallmouth bass weighing four pounds, 15 ounces. Edward Nisley caught ten bass below the Holtwood dam averaging one and a half pound per fish in weight. Fishing in Baker's Quarry near Marietta, Bern Gilman caught ten bass averaging almost two pounds apiece in weight. The fish were landed in three hours.

Catfish certainly are getting in the game fish class, according to Thornton Graham of Sharon. While trolling for muskies in the Shenango River above Sharpsville, Keith Lock hooked and landed a 36-inch channel catfish weighing 18 pounds. The big fish was taken on a white plug.

A black bass, believed to be the first to be taken out of the Sinnemahoning Creek as far upstream as Cameron in recent years, was caught by Bud Blair of Ridgway on Labor Day, according to Warden Robert J. Chrisman. The bass was ten inches in length. Nice catches of pickerel have been made in the Sinnemahoning this season.

The Oil City chapter of the Izaak Walton League is justly proud of a fine junior league chapter totaling 287 members. Boys in the chapter did highly commendable work in improving trout streams and in other conservation activities during the past summer.

Chalk up another type of food for watersnakes. J. C. Moffatt, ardent angler of Glenshaw, writes that after killing a large watersnake in the Raystown Branch of the Juniata River, he examined its stomach contents and found that it had just feasted on two newlyborn muskrats.

A SPRING FEEDER STREAM

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
Harrisburg, Pa.
Permit No. 270

Season Farewell

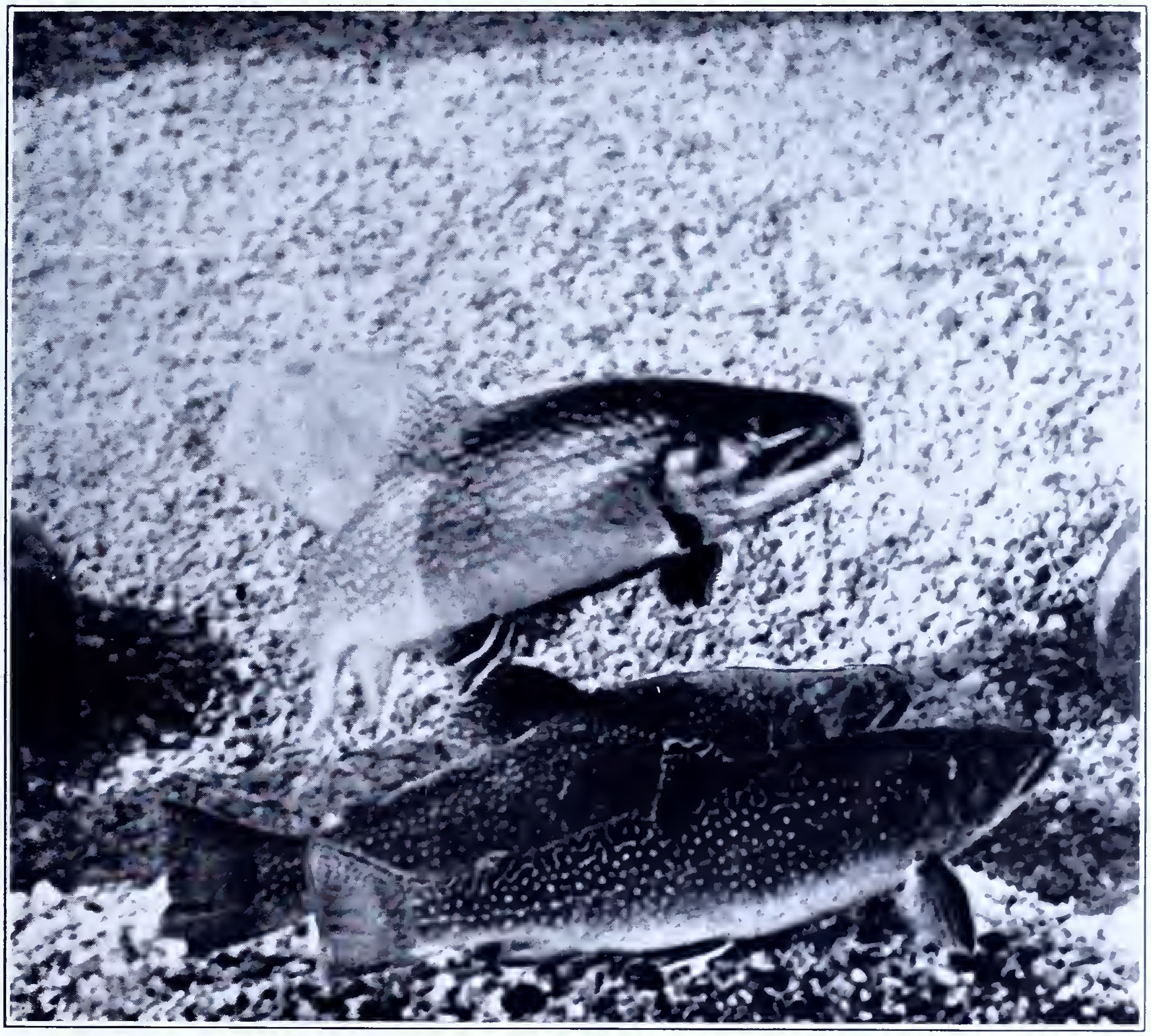
NOVEMBER thirtieth brings the curtain down on one of the greatest game fish seasons in recent years. And now, when long evenings loom, comes the angler's season of reveries.

Remember that giant bass that fooled you just when you thought he was yours, or that big wall-eyed pike that fought deep down until it broke away?

When the pipe smoke wreathes toward the ceiling, and you're in your easy chair—thinking back—about YOUR stream—these revery hours are happy hours. And winter-time is revery time.

From the action angle, however, don't forget that some great catches of suckers are in the offing for winter fishermen.

PENNSYLVANIA ANGLER



BROOK TROUT

P38.31
1.6

VOL. 2
NO. 12

OFFICIAL PUBLICATION
BOARD OF FISH COMMISSIONERS

DECEMBER
1933

OFFICIAL STATE
PUBLICATION

PENNSYLVANIA ANGLER

DECEMBER, 1933
Vol. 2 No. 12

PUBLISHED MONTHLY
by the
Pennsylvania Board of Fish Commissioners

* * *

Five cents a copy ~ 50 cents a year

* * *

ALEX P. SWEIGART, *Editor*
South Office Bldg., Harrisburg, Pa.

GEORGE GRAY, *Illustrator*

* * *

NOTE

Subscriptions to the PENNSYLVANIA ANGLER should be addressed to the Editor. Submit fee either by check or money order payable to the Commonwealth of Pennsylvania. Stamps not acceptable.

PENNSYLVANIA ANGLER welcomes contributions and photos of catches from its readers. Proper credit will be given to contributors.

All contributions returned if accompanied by first class postage.

Want Good Fishing?
OBEY THE LAW

COMMONWEALTH OF PENNSYLVANIA
BOARD OF FISH COMMISSIONERS

OLIVER M. DEIBLER
Commissioner of Fisheries

* * *

Members of Board

OLIVER M. DEIBLER, *Chairman*
Greensburg

JOHN HAMBERGER
Erie

M. A. RILEY
Ellwood City

DAN R. SCHNABEL
Johnstown

LESLIE W. SEYLAR
McConnellsburg

EDGAR W. NICHOLSON
Philadelphia

KENNETH A. REID
Connellsville

ROY SMULL
Mackeyville

H. R. STACKHOUSE
Secretary to Board

C. R. BULLER
Deputy Commissioner of Fisheries
Pleasant Mount

IMPORTANT—The Editor should be notified immediately of change in subscriber's address

Permission to reprint will be granted
provided proper credit notice is given

PENNSYLVANIA ANGLER

DECEMBER, 1933

VOL. 2 No. 12

EDITORIAL

Demand Exceeds Supply in Fish Conservation

IN an era when overproduction looms as a major obstacle to return of world prosperity, conservation's outstanding problem is production of fish and game sufficient to meet a growing demand. In sharp contrast to the glutting of world markets with agricultural products, for instance, the demand for more fish greatly exceeds the supply. Annually the number of fishermen invading our waters is increasing. Keeping pace with the times, the Fish Commission's hatcheries have been operated at the peak of their capacity, and yearly production of fish has risen to hundreds of millions. Of the total production, the hatcheries have furnished millions of fish for stocking that were of size sufficient to insure growth when planted, even at times under adverse conditions. Distribution of legal size trout last year exceeded the million mark. It is evident, however, that this great stocking program must be backed by streams capable of maintaining fish life to the peak of their capacity. Stream improvement is of basic importance in achieving this end.

During the war, when many of the great nations of the world were locked in conflict, an excessive demand for wheat and other staple farm products brought under the plow every available acre of land. The idea was to make two blades of grass grow where one grew before. The vast production program, geared up to meet a demand that with the close of the war ceased to exist, resulted in overproduction in the agricultural field as we know it today.

* * *

In contrast, let us compare conditions obtaining in fishing during the past twenty years. Twenty years ago, for instance, one fisherman was on the streams where ten are fishing today. Many of our warm water streams capable of sustaining fish life are subjected to heavy strain, not only from the angle of increased fishing but also through heavy catching of forage fish in the form of live bait from their waters. Certainly their capacity for producing and maintaining fish life during that period has not increased. As a result, we find a demand for fish that under present conditions cannot naturally be met through normal increase. Heavy stocking has, of course, overcome this condition to a large extent, but it is apparent that much better fishing would be had if not only hatchery production but natural production in the streams themselves could be relied upon.

* * *

Consider an ideal trout or bass stream, for example, with a large farm, run under modern methods and producing heavily. The farm, with its fertile land, is being brought to a peak in productiveness through fertilizer, and proper rotation of crops. Its yield of staple crops, wheat and corn, comes once a year. Now turn to the trout stream, regarding it in a similar light. The stream's main crop, obviously, is a maximum number of legal size trout. In order that it may yield this crop, forage is necessary, just as fertilizer is necessary for farm land to produce a maximum, and this forage must be available to trout during the year. It consists of tiny organisms, food for baby trout, minnows, crayfish, and at certain seasons of the year insects. The crop is taken, not by one fisherman, if the stream is popular, but by perhaps hundreds of anglers. Its growing trout, next year's crop, will be injured perhaps through careless handling after being hooked. The trout crop in this stream will be supplemented by introduction of healthy, legal size fish from the hatcheries, but the strain upon its productiveness is tremendous during a season that extends over three and one-half months.

* * *

Upon the large trout left in this stream, after the close of the season, and trout released to its waters from the hatcheries, will devolve the task of natural restocking for the trout crop of the future. If an abundance of food is provided by fertile stream beds and foliage on the shore, and sufficient shelter is available for adult trout and the young trout when they drop down to larger water from the spawning beds, the chances of a good crop from this stream will be definitely improved.

* * *

The key to better trout fishing and, to a certain extent, warm water fishing, is improvement of conditions under which fish must live. We cannot anticipate a crop great enough, under present conditions, to furnish a maximum of sport for anglers. Practical improvement of fishing waters, however, is just as essential to betterment of fishing conditions, as is bringing farm production to a peak through practical methods. And, in the instance of fish production, with the great interest now prevailing in this splendid sport, we may look forward to having every stream at the peak of its productiveness without fear of an oversupply of the product.

O. M. Deibler

Commissioner of Fisheries

• The Passing of

A STURGEON FISHING CAMP

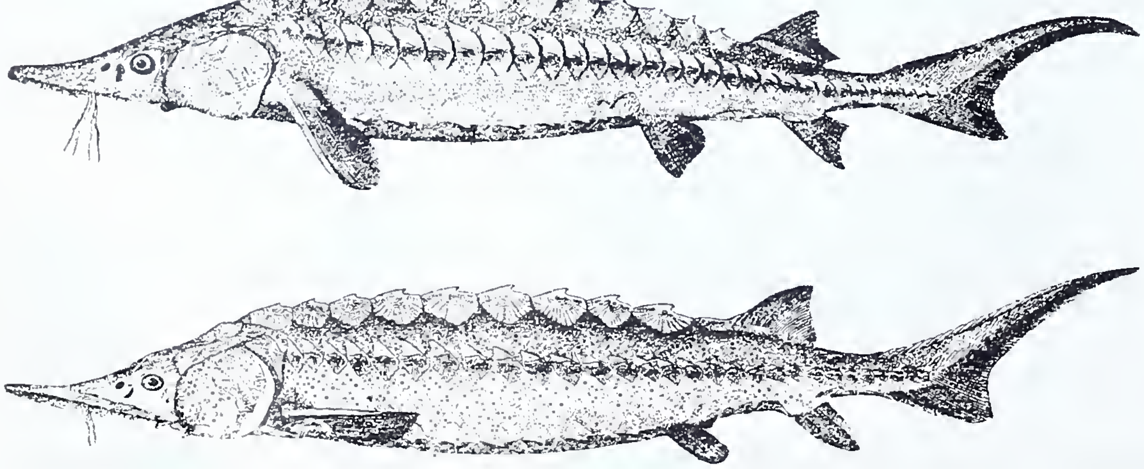
THE slaughter of the sturgeon in Pennsylvania's larger waterways, particularly the Delaware and Susquehanna Rivers, is one of the most regrettable chapters in the history of conservation in the Keystone State. That this great fish, also found in the waters of the Juniata River during the nineteenth century, should have been virtually exterminated, and, in many instances, its flesh left to rot in the sun as fertilizer for the soil, is vivid evidence of the ruthless exploitation of fish life in our waters. Occasionally, lake sturgeon are still taken by fishing boats on Lake Erie, but definite extinction of the common sturgeon has occurred in Pennsylvania rivers.

The sturgeon and garpike are linked with a prehistoric age, the Devonian or the Age of Fishes. Millions of years ago, when lush vegetation flourished in a tropical atmosphere, we are told, the prevailing animal life was fishes. During this period there were no trees or plants that bore flowers. The fishes were abundant in many of the waters and were of a form known as the Ganoid type. These great Ganoids were armed with bony plates, somewhat similar to the shell of a turtle, an armor of great strength for defense. Frequently, in addition to this protective covering, they possessed powerful jaws and teeth for offensive purposes. The garpike of today is one of the most destructive fishes of the fresh water, having fangs that afford its prey little chance to escape from its slashing attack. Sturgeons, while abundant, apparently were not as heavily armed as were other species during the Age of Fishes.

With the dawning of the Reptilian Age, many species of fishes had been driven to extinction, but the sturgeon survived through succeeding ages. Not until comparatively recent years, when the demand for caviar and sturgeon steak became insistent, was this giant fish, symbol of a forgotten age, exterminated in Pennsylvania waters. In its destruction, the agency of man proved a decisive factor. There was undoubtedly a glamor about the sturgeon fishing camps that flourished on the banks of the Delaware. Their prey was the greatest fish of the inland waters, and the sturgeon catch in the '70's ran into thousands of pounds. By 1890, the catch had dropped alarmingly, while that on the Susquehanna River had practically vanished.

It was not an uncommon event, in 1880 and during a few succeeding years, for the sturgeon fishermen to ship five or six cars at one time loaded with sturgeon and caviar to New York or Philadelphia. Shipment of five or six boxes simultaneously in 1900 occasioned comment. When the sturgeon first came into popularity as a delicacy for the table, sales were not easy to make. As late as 1885, shad fishermen on the Delaware were at times compelled to stop operating their nets until a large school of the giant fish had passed by. So abundant were the fish, and their roe and flesh held in such low esteem during the early '80's, that the roe or caviar brought only from $3 to $8 a keg. By 1900 it brought $110 a keg, and the caviar market was dominated with Delaware sturgeon roe masquerading under the name of Russian caviar.

The flesh of the sturgeon also rose in value. Early in the season of 1882, the flesh brought about six cents a pound, regarded as a high price. Later in the season, it was difficult to get one cent. By 1900, the price had risen to 12 cents. Two basic causes were responsible for the increased value of these fish. One was, of course, an increased demand for its roe and flesh. Its rapid extermination in the face of a rising demand, however, was probably an outstanding factor.



ABOVE—COMMON STURGEON, BELOW—LAKE STURGEON

the Sturgeon •

"Concerning its long pedigree," wrote Rev. H. P. Hutchinson, author of "Creatures of Other Days," in commenting on the sturgeon, "we ought to look upon this fish with great veneration. There are, indeed, few fishes which can boast of such an ancestry, although, unlike the garpike, it has not retained its primitive form. Its armor, one of the characteristics of the Ganoid fishes, has almost disappeared, there being but a few plates down the back. Its cusp-like teeth are gone."

Bashford Dean, in his "Fishes Formed and Living," says:

"The interrelationship of the four surviving forms of sturgeons has not as yet been definitely suggested. Transitional fossil forms have thus far been lacking, and the relative importance of the different structures in the recent genera cannot therefore be determined for purpose of comparison.

CUTTING ROE FROM A STURGEON

"The genus of the common sturgeon, *Acipencer*, is the most completely studied of the recent forms. It includes twenty or more (species), varying in length from one (a *brevirestris* of the Eastern United States) to ten yards (a *huso*, of Russia) and is altogether one of the most valuable food fishes of the rivers, lakes and coasts of the northern hemisphere. It is a sluggish, bottom feeding fish, common in muddy streams. Its broad and pointed snout, sensory barbels and greatly contracted jaws are the most striking differences from the *Palaconiscoid;* its dermal armouring has become reduced to five longitudinal bands of body plates, but is more perfect in the tail regions; its skeleton retains an entirely cartilaginous condition. In its larval stage conical teeth are known to be present, and the entire series of dermal plates are much larger in relative size.

"While the adult sturgeon does not possess the full armor of its ancestors of the Reptilian Age, curiously enough the young is better provided but as it approaches maturity these gradually disappear."

"The advantage of the markedly rougher armature," says Ryder, in his paper on the Sturgeon in the Bulletins of the United States Fish Commission for the year 1890, "of the young in the struggle for existence is obvious, as it is clearly adapted to render the young less convenient of delugation or mastication by the more ravenous predaceous forms inhabiting the same waters."

Abundance of the sturgeon in the Delaware and Susquehanna Rivers early in the nineteenth century is the subject of an article in the biennial report of the Fish Commission for 1896. It follows:

"Men not yet sixty years old say that even after they had passed their majority, it was not an uncommon sight to see several sturgeon during a single trip between Camden and Philadelphia jumping in the river. Mr. Samuel Williams, a resident of Burlington, N. J., now in his eighty-fourth year, says that when he was a boy, on one occasion he went with his father on a shad fishing trip in the lower Delaware, and during it he saw thousands of sturgeons. Once on this trip his father and his companion were compelled to take their nets in with great speed in order to save them from utter destruction, and as it was many fathoms were badly torn by this fish. The sturgeon passed their boat in such vast numbers that in a little while the occupants had secured and killed eleven. This was as many as they could take home, and as the run continued, they slew many more on the principle that it was a fish not only of scarcely any value but was actually a nuisance in the river on account of the damage caused the nets. Mr. Larzelere states that when he was a young man, one night, he with a number of young men and women were rowing on the Delaware in two boats. While proceeding up the river, only a few feet apart, a large sturgeon six or seven feet long jumped from the water and nearly capsized one of the boats, and the occupants were thoroughly drenched and frightened. The same gentlemen also said that William Stockton, the father of the Rev. Thomas H. Stockton, for a time chaplain of the House of Representatives at Washington, was at one time out boating, when a large sturgeon actually jumped into the boat and was secured."

Mr. John Fenimore, connected with the family of which Fenimore Cooper, the celebrated novelist was a member, related the following:

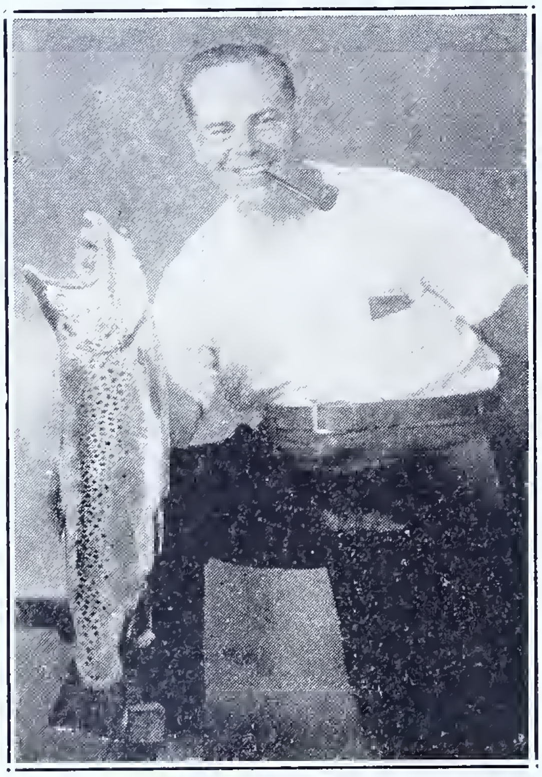
"Many years ago there was a little steamboat which plied the Delaware above Philadelphia called the *Sally*. On each side near her bows were two large round windows, which in the summer time were often open. One day when the *Sally* was on one of her trips up the river a large sturgeon in jumping made such a leap that it passed clear through one of these windows and landed in the vessel, where it was killed.

"Stories like the foregoing are quite common and many of them are well authenticated, and they serve as nothing else can to illustrate how numerous this species of fish were at one time in the Delaware River. For until recent years the sturgeon seemed to be little esteemed by the people living along this great stream. The roe was considered worthless except as bait with which to catch eels and perch or to feed to the hogs. From three to four cents a pound were the best prices that could be obtained retail for the meat, and it was not often more than twenty-five or thirty cents could be had for a whole fish. Mr. John Fennimore made a practice of fishing for sturgeon with nets at Dunks Ferry, near Bristol, in the latter part of the '20's, and until about

(Continued on Page 9)

Pennsylvania Record Fish for 1933

WEIGHT records for game fish taken in Pennsylvania inland waters toppled right and left during the 1933 fishing season. Not only were larger brown and brook trout, smallmouth and largemouth bass, pickerel, and wall-eyed pike taken this year in many streams and lakes, but a definite trend upward in the weight of popular species such as the bullhead catfish and suckers was observed.



HARRY McCLINTIC, MILL HALL, WITH THE RECORD BROWN TROUT FOR 1933

The 1933 trout season was well under way, when the taking of a mammoth brown trout from the Yellow Breeches Creek in Cumberland County caused a stir with Central Pennsylvania fishermen. Harry Squibbs, of Leidigh's Station, had hooked the big fellow a number of times, only to have it break away. Finally, equipped with heavy tackle, and using a minnow for bait, he lured the giant brownie to strike. After a hard battle it was landed, and when weighed by Warden George James, of Carlisle, tipped the scales at eight pounds. It was 27¼ inches in length and exceptionally heavy in girth.

RUNNER-UP IN THE BROWNIE DIVISION CAUGHT BY HARRY SQUIBBS, YELLOW BREECHES. WARDEN GEORGE JAMES DISPLAYS THE CATCH

"That trout has set a season record," was the prediction of more than one fisherman who saw it. But 1933 had still another surprise in store. Up on Fishing Creek, Clinton County, a big trout of tackle-smashing tendencies had held sway for a number of years. Harry McClintic, expert Mill Hall fisherman, played it to a finish one evening in June. The weight record for brown trout taken on hook and line was definitely set by this giant of the brownie clan. In length it measured 27¾ inches, was of massive girth, and weighed—dressed—nine pounds and one ounce. A fine brook trout was found when its stomach contents were examined. To complete the trio of brown trout of eight pounds or over caught this year, a fish was taken on a tributary to Spruce Creek in Huntingdon County that topped the eight pound mark. Sawkill Creek yielded a 25-inch brown trout weighing five and one-half pounds to Edward Bosler.

Topping the brook trout classification were two splendid brookies taken on Dingman's Creek in Pike County. George Raub, Easton angler, the Fish Commission's records show, captured the prize brook trout of the season when he caught a beautiful specimen of the native trout, measuring 19 inches in length and weighing three pounds. His trout was pressed hard for first honors by a brookie measuring 17½ inches and weighing 2¾ pounds. This fish, also a Dingman's Creek product, was caught by Howard Case of Catasauqua. A number of brook trout over 14 inches in length were taken in streams of the North Tier counties.

With opening of the bass season on July 1st, angling interest turned to the famous North Branch of the Susquehanna, the Conodoguinet, Lake Gordon, The Allegheny, French Creek, and other fine Pennsylvania bass waters. Catches of big smallmouth bass were reported from many streams. Early season reports were headed by the taking of a 21½-inch smallmouth bass, weighing 4 pounds, 11 ounces by Bert Manross of North Warren. Manross caught the big fellow on a plug while fishing in Conewango Creek. The largest smallmouth bass on the Commission's records, however, was taken in Lake Wallenpaupack. George Rickard of Honesdale, who made the catch, had dressed it and it had been out of the water nine hours before being weighed. It tipped the scales at 6¼ pounds.

Lake Gordon's giant largemouth bass bowed last season to the weight record established by a fish taken from Lehman Lake, Pike County. William Schoonover, who lives at the lake, caught a largemouth weighing 8¼ pounds. Runner-up to the Lehman Lake bass was a largemouth taken from Lake Gordon in Bedford County during July by Bink Wilson, of Cumberland, Md. Wilson's catch tipped the scales at 6½ pounds and measured 23½ inches in length. A number of largemouth bass exceeding five pounds in weight were taken from Pennsylvania waters.

It was in the pike-perch or wall-eyed pike division, however, that the real fireworks of amazing catches occurred. At least three mammoth wall-eyes, each weighing 10 pounds or more were caught by Keystone state fishermen. The Delaware River at Egypt Mills was a setting for the outstanding wall-eyed pike catch of the season. Trolling with a light rod and using a lamprey eel for bait, John Andrews, of Cementon, played a pike-perch weighing 10½ pounds to a finish. The great pike measured 32½ inches in length. A ten-pounder was taken in Crystal Lake during September by Rev. Appleton, of Philadelphia, while Michael Boyle, fishing in Conneaut Lake, caught a wall-eye weighing 9¾ pounds. An unusually large number of pike caught in streams and lakes in many sections of the state indicates that this splendid game fish is staging a great comeback. Many pike over four pounds in weight were taken.

JOHN DECKER'S 32-INCH PICKEREL CAUGHT IN LAKE WALLENPAUPACK

RECORD MUSKIE FOR 1933 TAKEN BY WALFORD LARSON FROM LAKE CANADOHTA

Pickerel fishing also was exceptional, and Lake Wallenpaupack yielded the largest fish of this species reported. The best pickerel reported was taken by John Decker at LaBar's Landing on Wallenpaupack. Decker's prize measured 32 inches in length. While fishing on November 8th, at Gilbert's Landing, on Wallenpaupack, R. L. Koehler caught two fine pickerel, one measuring 30 inches, the other 28 inches.

Canadohta Lake yielded the largest muskie reported this season from Pennsylvania waters. Walford Larson caught a "water tiger" measuring 49½ inches in length and weighing 30 pounds. The Allegheny River, Conneaut Lake, Lake LeBoeuf, and French Creek also yielded a number of muskies weighing better than ten pounds.

Bullhead catfish and suckers of unusual weight were also taken. Fishing in Holtwood dam on the Susquehanna, Paul Martin of Lancaster caught a bullhead measuring 21 inches in length and weighing four pounds. A 21-inch bullhead was taken on Tuscarora Creek. The largest sucker reported was caught by Russell Osman, of Cocolamus. Osman made his catch early this spring on the Cocolamus dam. The sucker weighed five and one-half pounds.

Large fall fish, sunfish, rock bass, and yellow perch were also taken. Several two-pound perch were reported, while the largest fall fish listed was taken by Reuben Newcomer, of Suedberg, when fishing in Fishing Creek. The fall fish, 16 inches in length, was caught on a dry fly.

This rather brief survey of unusually large fish taken in Pennsylvania waters indicates that 1933 will go down in the records as an outstanding fishing year.

A sportsman will not disturb a hen on her nest; the same thing should apply to a fish on its spawning bed.

Birds Aid in Planting Fish in Strange Areas

IT HAS been said by one eminent authority on fish, "If one builds a pond having no inlet or outlet and positively makes certain that no fish are introduced by man, in a short time fish will appear, that is, of course, providing the pond retains water." This is an indisputable fact. How these fish make their appearance in these secluded areas is always very interesting and the mystery of this is accounted for in several ways. One or more varieties of minnows generally appear first. A number of varieties of the minnow family deposit their eggs on aquatic vegetation. These eggs are very adhesive or sticky, and cling to plants or may be transferred from the plants to any foreign object with which they come in contact. Birds that frequent the shore line may, through the adhesive quality of the eggs, transport them over short flights. Many of these shore-wading birds transport aquatic plants. Water plants have great power to maintain moisture and eggs carried in this manner can withstand long journeys.

An example of how easily fish can find their way into strange areas on aquatic plants was demonstrated a few years ago at one of the State Fish Hatcheries. A quantity of aquarium grass was purchased in Florida and sent thru the mail and when it arrived at its destination was planted in a large wooden tank. In a short time a school of top minnows made their appearance. There was no other method for these fish, which were perfect strangers in that vicinity, to find their way into the tank, other than by being transported with the grass. Birds are given credit for assisting with the distribution of many forms of life such as the carrying of seeds of trees, shrubs and flowers, the transportation of snails, leeches and other forms of life that cling to the body or are carried in the mouth, and the transportation of fish disease organisms which we are told live one cycle of their existence in the throats of shore-wading birds, to say nothing of the stork that so greatly assists with the needs of the human race.

The yellow perch is another fish that finds its way into strange waters by the assistance of birds. Perch eggs are not adhesive but are suspended on submerged plants and brush in long ribbon-like strings. The strings of eggs are eaten by many kinds of birds and the toughness of the membrane forming the ribbon-like mass of eggs makes them easy to carry in the mouth of the bird in flight. Another reason for the successful transportation of these eggs by birds is due to the fact that the membrane that holds the mass of eggs intact is filled with water which makes them resistive to jars and sudden temperature changes. The eggs of a number of other kinds of fish such as the trout and catfish, for example, do not lend themselves readily to this method of transfer. Yet birds have a way of aiding these fish to find their way into strange areas.

Photo Courtesy Game Commission

AMERICAN EGRET, A SHORE WADING BIRD

The osprey and other birds that catch and carry their prey in their claws see to this. Some of the unfortunate fish carried in this way escape during flight and a few of them are lucky enough to fall into strange waters. At the hatcheries, fish-eating birds take a heavy toll on the fish and it is not uncommon to see the osprey pick up fish from one pond and in its flight unintentionally drop the fish into another pool. Of course some are injured and die, yet frequently some fish landing in strange areas survive this crude method of transportation.

Varied Catch Made at Night

October fishing yielded a varied catch from the North Branch of the Susquehanna River to Dr. J. L. Tyler of Laceyville and Alva Fassett of Tunkhannock, according to Warden M. E. Shoemaker, of Laceyville. Casting plugs from 6 to 9 o'clock on the evening of the 20th, they caught four large rock bass, two wall-eyed pike, and 13 smallmouth bass. The entire string weighed 19 pounds, and the bass ranged in weight from one to three pounds.

Autumn fishing on the Branch this year, writes Shoemaker, has furnished exceptional sport. An unusual number of big bass have been taken.

CONSERVATION TOPICS

Pollution's Effect on Fish Life Now Being Checked

Experiments are now being conducted at Pleasant Mount hatchery to determine the effects of various types of stream pollution on fish life. These experiments, under direction of engineers of the Sanitary Water Board, are being made to determine concentrations of pollution necessary to kill fish life in a stream. Laboratory, equipment, and specimens are being furnished by the Fish Commission.

One of the difficulties confronting the Sanitary Water Board in legal proceedings in the past has been establishment of evidence as to just what concentration of various kinds of pollution is necessary actually to kill fish. Present tests are expected to yield much vital data on the subject.

Specimens of fish common to the waters of Pennsylvania are being subjected to the tests, and their reactions to the various concentrations carefully checked.

To Improve Streams

The C. C. C. Camp at Kooser Run and the camp at Blue Hole Run, in Somerset County, according to Warden Sam Henderson, of Greensburg, plan to build dams and retards on Kooser Run and place deflectors in Laurel Hill Creek.

Watersnakes Figure in Strange Episodes

Samuel Lewis, New Brighton angler, furnishes interesting sidelights on the habits of watersnakes in a recent letter. The taking of one snake on a spinner and another on a live minnow are incidents that occurred on western Pennsylvania streams, he writes.

While camping on Little Beaver Creek, Lewis observed a large watersnake that had just killed a ten-inch sucker. The snake succeeded in escaping at the time. Next day, however, while fishing, a five-inch live minnow for bait, the New Brighton angler caught a watersnake on hook and line that he believed to be the same reptile.

Hearing a slight sound in the reeds near shore when fishing French Creek, Lewis saw a watersnake that had just fastened its fangs in the leg of a big frog. So small was the snake that the bullfrog succeeded in breaking loose, and when last observed was traveling through the weeds at a record-breaking pace for frogs.

Howard Jewell, of Beaver Falls, however, had an experience with snakes, according to Lewis, that tops them all. While night fishing for bass in Brush Creek, Beaver County, Jewell felt a peculiar strike, and when he had reeled in, found that he had landed a large watersnake. One hook was firmly embedded in its mouth.

IDEAL FROG AND BULLHEAD WATER. A POND IN NORTHEASTERN PENNSYLVANIA

Frogs of Pennsylvania

By C. R. Buller

Deputy Commissioner of Fisheries

Editor's Note: *Inquiries relative to the various species of frogs common to Pennsylvania frequently are received. The following descriptions should be of assistance in identifying the different species.*

PICKEREL FROG

Identification Marks:—The ground color of the upper parts is brown, with the under parts of the legs and belly an orange yellow. The under parts of the lower jaw are white, sometimes marked with brown. On each side of the back is a low, broad fold of skin (the lateral fold) extending from the eye backward. Between these folds, on the back can be found four, more or less conspicuous folds. Between the lateral folds, also on the back, are two, more or less, opposite rows of dark, squarish spots and below the lateral folds, on each side, two irregular rows of dark spots, generally somewhat smaller than those found on the back. The legs are barred or irregularly spotted.

Range in North America:—Throughout the eastern part, east of the Great Plains and north to Hudson Bay.

Size:—From 2 to 3 inches in body length, measuring from the tip of the muzzle to the posterior end of the body, probably too small to have much of a commercial value. Another objectionable feature, from a commercial standpoint, would be the secretion of acid substance in the skin.

Natural Habitat in Pennsylvania:—The pickerel frog spends little of its time in the water, but enjoys being nearby, where it can keep its skin moist, seek protection, and deposit its eggs. During extended periods of damp or rainy weather, it wanders considerable distance from the water side, probably in search of caterpillars, butterflies, millers, gnats, beetles, etc., but during dry weather, it is inclined to stay near the water, where it probably feeds upon the type of small life that makes its home about the shore lines.

Spawning Habits:—In Pennsylvania, the eggs of the pickerel frog are deposited in May or June, generally along the shore lines, in shallow water. When deposited, the eggs are in the form of a more or less irregular mass, several inches in diameter. After hatching, the tadpole develops into the frog, in July or August of the same year.

LEOPARD FROG

Identification Marks:—The ground color of the upper parts may be green, gray or brown, which sometimes changes rapidly from one color to the other. The under parts are white or yellowish white. The legs are marked with dark spots or bands. On each side of the back, is a conspicuous, broad, lateral fold, with two or more broken folds of skin extending lengthwise along the back between the lateral folds. Between these folds may be found two irregular rows of dark, round spots and below the folds on each side are two additional rows of irregular, dark spots.

Range in North America:—The leopard frog is probably the most common frog in North America, east of the Sierra Nevada Mountains.

Size:—When fully matured, ranges in size next to the green frog measuring from 3 to 4 inches.

Natural Habitat in Pennsylvania:—The habitat of this species, like that of the pickerel frog is not, as a rule, in the water, but nearby. In damp, wet weather it is often found wandering considerable distance from its aquatic home, which may be any body of water, large or small. Its natural food consists of earthworms, insects, spiders, other frogs, and in fact, almost any kind of life, small enough to be swallowed.

Spawning Habits:—Spawning takes place in April or May. The eggs are usually deposited in shallow water, where they may be attached to sticks, grass, etc., or left free. The tadpole develops into the frog in July or August of the same year.

GREEN FROG

Identification Marks:—The color of this frog is extremely variable, although the typical color is bright metallic green on the head and shoulders, and dark olive or brown, posteriorly. The under parts are white with some marbling, the sides of the body may be marked with large, dark blotches. In some instances, the throat of the male is bright orange, while that of the female may be white, spotted with dark. It has two conspicuous ridges or lateral folds, down either side of the back.

Range in North America:—Commonly found throughout the eastern portion, including Canada and Florida.

Natural Habitat in Pennsylvania:—The green frog is quite aquatic spending much of its time in the water. While it is found quite commonly about springs, small ponds, or small creeks, it appears to have quite a liking for large bodies of still water, as lakes, mill ponds, quiet portions of large streams and rivers, where it spends much of its time in the shallow water, along the grassy shore lines, feeding upon insect life, tadpoles, small frogs, and small animal life in general.

Spawning Habits: — The spawning is rather extended, eggs being found from May 1 to July 1 and probably later, depending much upon the weather temperatures. The eggs are deposited in about the same places as those of the bullfrog, but the egg mass is probably more commonly found floating. From the time the egg hatches into the tadpole, it requires one year or more before it develops into the frog.

BULL FROG

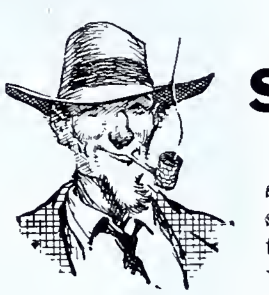
Identification Marks:—The upper parts vary in color from green to greenish brown, with shades ranging from light to very dark. The back and sides may be plain in color or may be spotted with dark. These spots when present, may be distinct or connected. The arms and legs also, may be spotted or barred with dark. Its under parts are yellowish white, either plain, or spotted, or mottled with dark. It has no lateral folds or ridges down either side of its back, although a strong fold of skin extends from behind the eye to the arm, curving around the ear. To the uninformed, the green frog and the bullfrog might be easily confused. The bullfrog is easily identified from the former by the absence of the lateral fold.

Range in North America:—East to the Rocky Mountains, including Florida and Texas.

Size:—The largest of the Pennsylvania frogs. The adult specimen often measuring from 6 to 8 inches in body length.

Natural Habitat in Pennsylvania:—The bullfrog is more aquatic than any of the other Pennsylvania frogs. It rarely strays from the water for any distance, unless disturbed by enemies, and prefers large areas, as lakes, ponds, and quiet running streams. It is very voracious, feeding upon almost any life, small enough to be swallowed.

Spawning Habits:—This frog is the last of these four species to spawn. The spawning may take place any time from June 15 to August 1, depending upon the water and air temperatures. The size of the egg mass is comparatively large, oftentimes measuring as much as 5 square feet. The eggs are deposited in various places, such as around submerged, or partly submerged stumps, rocks, aquatic plants, brush, etc. The depth may range from those floating on the surface, to those submerged several feet. The tadpole requires two years or more, before it develops into the true form of a frog.

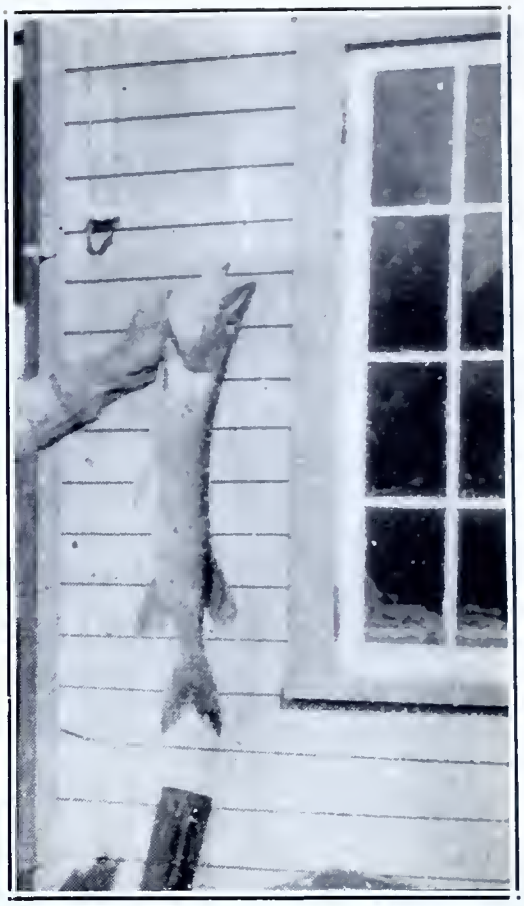


Seth Says

'Tain't often I git sore, but when I see some feller slap young trout back into the water jest because they don't make legal size it fair makes my blood bile. It's these fellers, and they ain't real fishermen, not by a long sight, that spoils the fishin' for others.

Long about the middle of trout season, I took my tackle over to the run fer a mess of speckled trout. We had jest had a purty hard rain, and the water was riled enough to make good fishin'. I reckon that's what this other feller thought, too, fer when I comes up to my pet fishin' hole, there he was. Well, sir, I was a-goin' to move on, as I always give the first man at a hole the right chance, when he hooks a fish. Out it came, hard enough that I could hear the slap when it hit the rocks. By gorry, that feller measured the fish, found it wasn't big enough, and heaved it back into the run as hard as he could. About a second later, that little trout comes floatin' to the top, sort of turned once or twice, and floated downstream dead. Mebbe I didn't light into the feller. All I hope is thet what I told him done some good.

There's no better way to find out what kind of man a feller is, I reckon, than to watch him fishin'. Ef he's of the right stuff he'll show it when he takes a fish that's a little under size.



WALLENPAUPACK PICKEREL

Sport for Tomorrow

Out in God's great open spaces
Away from the noise, din, and faces:
Where I may be alone, but not forget
That "Good Ole Nature," and I have met.
On the streams and banks I pray
As I have done in no other way:
Thou has given a time for thanksgiving
And a place where life's worth living.

I drive my fly, up the stream
Where the first rise is seen.
A perfect cast, and then a strike.
He's hooked, just watch that fight.
The water churns, the reel sings.
He breaks, rushes, and upward flings.
Then a speckled beauty is in the net!
As proud a fighter as ever I met.

That warrior fought, but not in vain,
For maybe he and I will meet again;
And tomorrow, more sport I'll find
From stocking fish caught on my line.
My creel is empty, by body weary,
Yet my soul is bright and cheery.
I work for tomorrow—today—
In stocking the fish that way.

—Ray Neirle.

RAYSTOWN BRANCH FISHING POPULAR

From Warden Lincoln Lender comes word that the Raystown Branch of the Juniata has provided the best bass fishing of recent years in that vicinity.

"I met two fishermen on the Raystown Branch," he informed the Fish Commission, "and they had fifteen bass, all twelve inches and over. Also have seen a number of other nice catches on this stream. Mr. Evans, of Everett, holds the record for the largest wall-eyed pike landed in recent years in the branch. The fish was 29½ inches long and weighed seven pounds two ounces."

The Propagation of the Brook Trout at the Pennsylvania State Hatchery

By C. R. Buller
Deputy Commissioner of Fisheries

IN THE early days of the state hatcheries brook trout were sent out for distribution in the fry stage or in other words, when they were only a few weeks old, but owing to the unnatural conditions existing in most of Pennsylvania's trout streams today it is now necessary to stock the waters with larger sized fish. This size was gradually increased until today no trout are liberated from the State hatcheries for stocking purposes until they have attained the length of six inches or over.

This change to the distribution of larger sized fish necessitated remodeling of all the trout hatcheries, until today the Board of Fish Commissioners can retain at their hatcheries more than three million trout, of a length of four inches or over. The rate of growth of the trout at the hatcheries is about as follows: first year, five to six inches; second year, eight to ten inches; third year, twelve to fourteen inches. Thus it will be noticed that many of the trout are held at the hatcheries from eight months to two years.

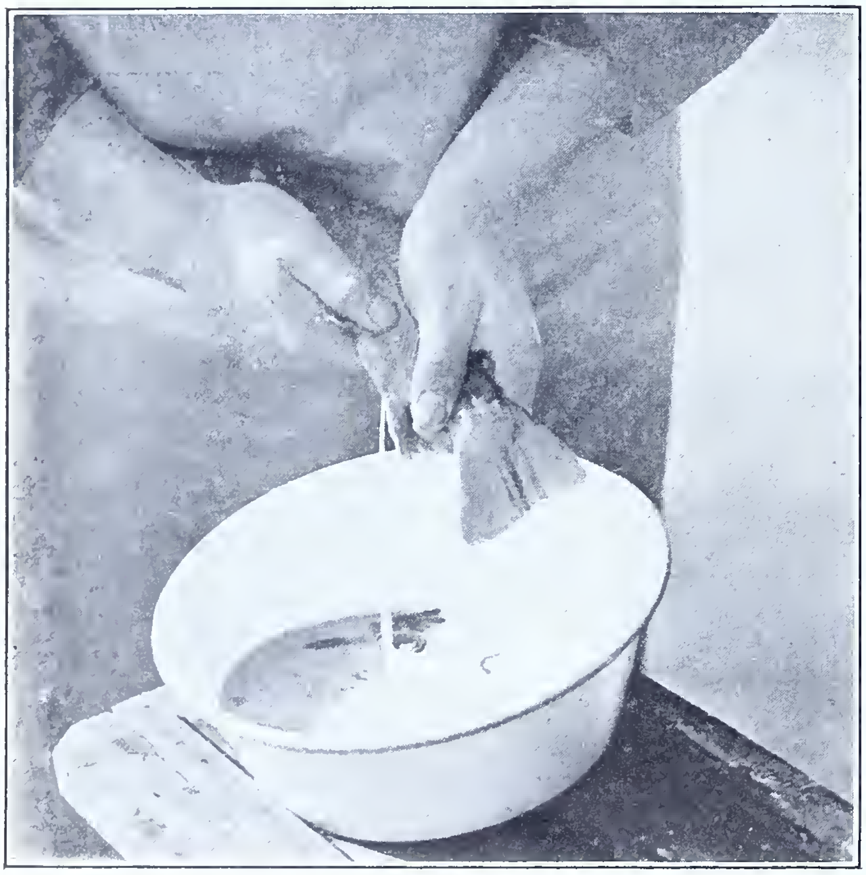
A trout hatchery now consists of the hatchery building, brood ponds, nursery ponds and rearing ponds. In the brood ponds the brood or parent fish are retained for the purpose of producing eggs. Brook trout spawn once a year, usually between October 15th and November 15th. As spawning time approaches the male and female brood fish are separated. This is done to eliminate, to a certain extent, the fighting among the males at spawning time when the females are present, to have the males where they are easily obtained when needed, and to eliminate the unnecessary handling of them during the sorting of the females.

A female produces from one hundred and fifty to two thousand eggs, depending upon her age and size. Not all females become ripe or ready to produce eggs at the same time, hence about every three days, during the spawning season, the females are examined to determine their condition as to ripeness. The abdominal walls of a ripe female will be soft and pliable to the touch. When the ripe females have been selected they and the males are placed in separate spawning pens convenient for the spawntakers to catch them in their hands. The eggs, and milt or spermatic germ of the male, are extruded into small pans by the spawntakers in the right proportion to insure a proper fertilization of the eggs. During the egg taking process the spawntaker exerts a gentle pressure with the finger along the ventral surface of the fish from forward towards the tail. If the fish are in proper condition to spawn the eggs or milt will flow freely from them without exerting undue pressure. It is needless to say, the handling of the fish at this time is a delicate task and full knowledge of what is required is necessary or the results will be injury to the parent fish, often resulting in death.

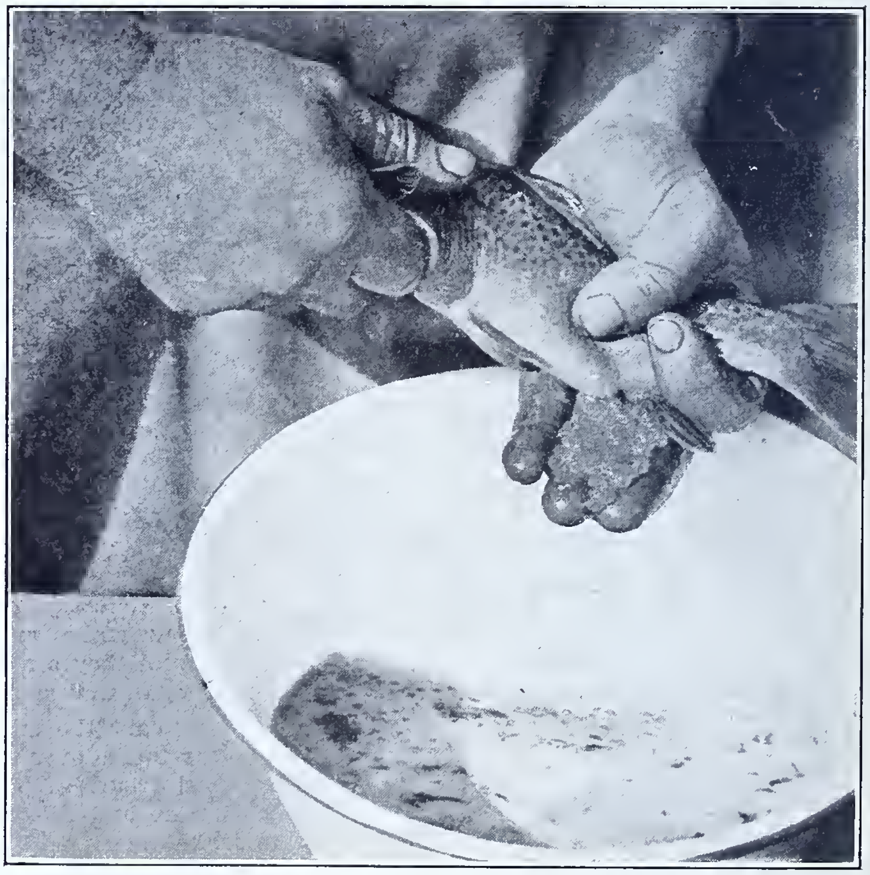
This operation is repeated until the pan is full of eggs and milt, the surplus milt is then carefully washed from the eggs and the contents are placed in the hatchery building on specially constructed wire trays in troughs of running water. Each tray holds approximately two quarts of eggs with a count of from twelve to thirteen thousand to the quart. The eggs are now ready for the process of incubation. This requires from forty-five to eighty-five days, depending upon the temperature of the water. During this period, owing to partial transparency of the egg, the growth and development of the baby fish can be seen within the egg.

At different stages of development the eggs require different handling. During the process of development, the unfertile eggs turn white, and these are removed daily. If the eggs become covered with an excess of sediment this is removed to prevent them from smothering, and during certain periods the position of the egg must be changed to insure healthy development of the little fish.

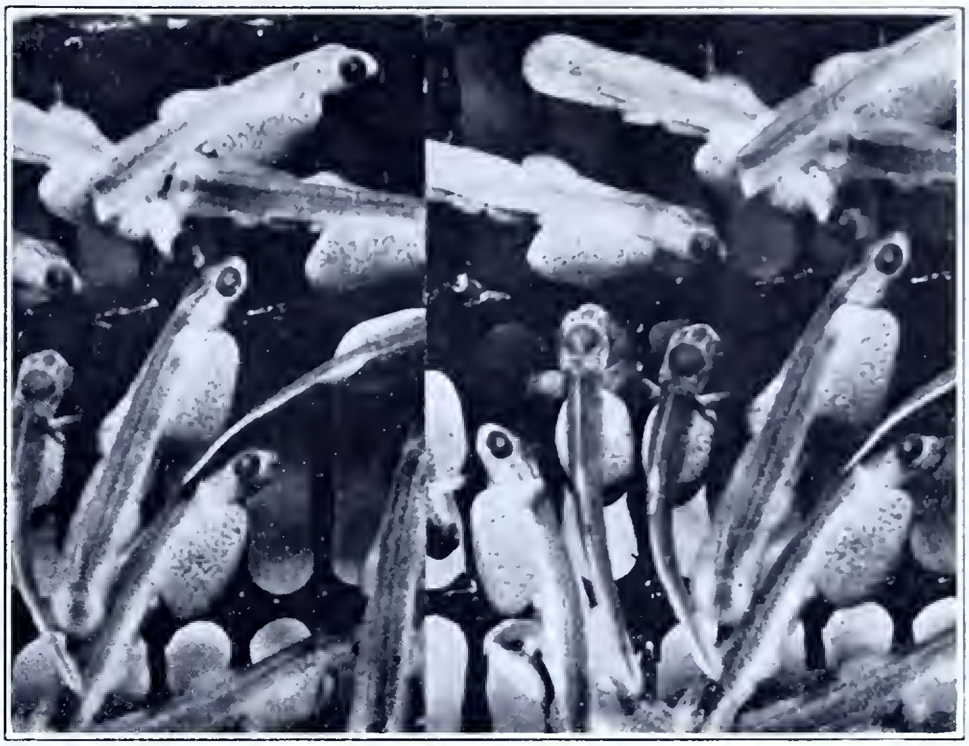
As hatching time approaches the baby fish



EXTRUDING EGGS OF FEMALE BROWN TROUT



EXTRUDING MILT OF MALE BROWN TROUT



BABY BROOK TROUT, SHOWING FOOD SAC

can be seen in motion endeavoring to break through the shell. When this is accomplished the little creature drops through the specially constructed wire tray to the bottom of the trough from which they are removed and placed in the nursery troughs of running water on beds of thoroughly washed gravel. At this period of the little fishes' life they are very delicate and helpless creatures.

Their food, for the first fifteen to thirty-five days of their existence, is taken from the yolk bag or food sac attached to the lower portions of their body. As this is gradually absorbed they become stronger and swim up in the troughs facing the water current.

They are now ready to start taking food through the mouth. The food of these baby fish consists of very finely crushed sheep liver and clabbered cow's milk. All coarse fibers and slime are removed from the crushed liver by a washing process before it is introduced into the troughs. The feeding of the baby fish at this age is an exacting task, requiring a skilled and observing attendant. The chief mission in the little fellow's life, apparently, is to eat. The attendant must satisfy this appetite in order to promote a rapid and healthy growth and still not allow any large amount of food to settle to the bottom where it would contaminate the trough unless promptly removed.

During the day time the baby fish are fed constantly, that is the attendant walking from one trough to the other scattering a small amount of food in each trough, only sufficient food being introduced at one time that the fish are able to consume it before it settles to the bottom. Conditions are kept as sanitary as possible in and about the building and troughs. During their stay in the nursery troughs the dead and weak fish are removed daily, as are also the uneaten particles of food and other foreign substances. When conditions require it, which is usually about twice a week, the sides and bottoms of the troughs are thoroughly scrubbed. The baby fish are kept in the nursery troughs and cared for in this manner until they are taught to feed properly and until weather conditions are settled in the spring. They are then transferred to the nursery ponds. The same sanitary conditions are maintained in all the outside ponds as in the building. The fish in the nursery ponds are fed the same food until they have reached the age of six months. Their diet is then changed to the ground liver, heart and lights of sheep. Three feeds daily of all the food they will consume without leaving any lying on the bottom of the ponds, are given them until they are about one year old. From then on, including the brood fish, they are fed one feed daily.

Where fish are confined in large numbers in small areas, the fish culturist must be constantly on the alert to guard against disease. It follows that he is very particular to see that the fish are fed no food that is contaminated. The sheep plucks are purchased from the large meat packers. The meat is delivered to the hatcheries in a fresh or frozen condition and immediately placed in refrigerators, until consumed by the fish. All this food bears the stamp of the Federal Inspectors.

Fish, as with all other animals, are irregular in growth, so that when fall approaches, in the nursery ponds will be found three sizes of fish. These are carefully sorted and placed in the rearing ponds according to their size. The larger ones are now ready for distribution, the smaller ones are held over until they have attained the size desired.

From forty-eight to sixty hours before the fish are to start on their journey to the public streams they are placed in the shipping room in storage tanks and all food kept from them. Due to unnatural motion of the trucks, fish with a full stomach become sick throwing off through the mouth the undigested particles of food, thus contaminating the water in the can in which they are required to live until they reach their destination.

The fish are usually shipped in the standard forty quart milk can. They are carefully counted into each can, the number to the can running from eight to fifteen fish, depending upon their size, which is over six inches, length of journey and weather conditions. A consignment of fish usually consists of from forty to eighty cans.

PASSING OF STURGEON

(Continued from Page 3)

1835. Mr. Vansciver and Mr. McElroy, two other fishermen of that neighborhood, also carried on the same business. They used a twelve-inch mesh and drew their net over the bar near the Pennsylvania side, a favorite spot for the sturgon. Sometimes twenty-five or thirty were taken at a single haul. The fish brought very little money, however, seldom more than thirty cents apiece and sometimes as low as twelve and a half cents apiece. Mr. Williams says that a favorite method with many fishermen of catching sturgeon in the month of August prior to 1835, was with the harpoon, and that the choicest spot for this method was about Dutch Island near Bordentown. One of the most skilful users with this instrument was a man named James Douglas. According to the narrators this person very rarely missed his aim in following this manner of fishing. This harpooner stood in the bow of a boat and when he approached near enough to his prey threw a heavy harpoon with a short length of line attached. Should the harpooner find he could not hold the fish after it was struck he dropped the rope overboard, and a large cork fastened at the loose end saved it from being lost, and materially helped to tire the fish out. A few sturgeon were also caught by lassoing but this was very rarely done.

"According to Mr. Martin, in his 'History of Chester,' sturgeon fishing as a regular industry in the river below Philadelphia, at least on the Pennsylvania side is not more than twenty years old. In treating of the subject Mr. Martin says: 'A new source of industry has lately (1873) been started in the vicinity of Chester, the catching of sturgeon. As far as I can learn the first effort in this enterprise was made by Henry Schacht, who sometime ago, with scant means and but one boat located himself on Ridley Creek, from which place he removed to Chester Creek, and afterwards, with wise forethought, when more prosperous, purchased Monas Island, opposite Chester; there, by means of piles, etc., he erected a pen in which to retain the fish alive for the most profitable market.

"'Mr. Schacht was drowned on a dark and dismal night last spring, and a relative, Henry Henhy, succeeded to the business, which had greatly increased.

"'At the foot of Edgemont Street is moored a large scow, well arranged for the comfort of those employed. There are bunks for their sleeping arrangements and a cook for their meals. Here the fish are brought, the meat sent to New York, where it commands a ready sale at about seven cents per pound,

(Continued on Page 14)

POINTERS ON FISHING FLIES—SPINNERS FOR BASS

Not only is fly-fishing for bass the most sportsmanlike method for taking these splendid game fish, but from the standpoint of dollars and cents, it represents a real saving to the average fisherman. Warden M. E. Shoemaker in a recent article outlines this great type of fishing and explains just why economy is served by resorting to it. His letter constitutes a strong argument for the acme of the angler's sport. Here it is:

The cost of live bait is usually from three to twenty-five cents for each bait and the average fisherman takes with him two kinds of bait, generally about twenty of each kind. Some desire a greater number. This entails a cost of from $1.20 to $2.00 per trip and if the bait dies the expense is greater, the trip may be ruined, and the next trip will be just as expensive. At the end of the day the catch may be large but the fisherman has unintentionally worked a great deal of damage. With the flies the first cost is a little greater but there is no loss for a long time and in the end the cost is much less, not only financially but from a conservation angle. The fisherman is always supplied with bait when using flies. The majority of flies today can be purchased for fifteen cents each and it is not uncommon to catch from forty to fifty bass on one fly before it is unfit for further use. With bait fishing one good strike requires a new bait.

FLY FISHING FOR BASS ON THE ALLEGHENY RIVER

Contrary to general opinion, it is not necessary to load up with a great number of patterns of flies. Flies tied on No. 4 eyed hooks are recommended and four or five patterns will serve the purpose for any fisherman. For the benefit of all concerned several good patterns are suggested. The Lord Baltimore with Jungle Cock Wing is highly recommended, the Cahill, Reuben Wood, Paramachene Belle and Wickhams Fancy are very good. This gives an assortment of colors from black to white. There are many other patterns which are popular but it simply becomes a matter of taste as to which pattern produces the best results for the individual.

Flies tied on eyed hooks last much longer than those tied on gut. The gut deteriorates very rapidly and the flies sometimes are a total loss before being used. The eyed flies are easily tied to the leader which should be single and about ten pound test. The silk worm gut can be purchased in coils for about $1.25 per coil and there is enough to last two years for the average bass fisherman. Leaders should be from three to six feet in length.

A small spinner of either brass or nickel is highly recommended and when attached to the eyed fly is very effective. A No. 1 or 2 size is recommended because it adds very little weight to the fly. Both sizes are mentioned as it is not uncommon to find one manufacturer making a No. 1 spinner and another making a No. 2 spinner of the same size. There also are many floating lures for fly rods which are very effective. If the fisherman wants real sport he should use a No. 12 dry trout fly when the bass are feeding on the surface. This will produce thrills that will not soon be forgotten.

A nine and one-half foot rod from five to six ounces is recommended for those who already do not have a fly rod. A small featherweight reel which will hold thirty yards of line is sufficient and need not be expensive. The line is one of the most essential parts of the equipment and is the prime factor that makes fly fishing truly easy. The majority of beginners make the great mistake or using too light a line. The line must be heavy and either level or double tapered. It depends on the individual as to which type he may like best.

While practically the same fundamental rules are followed in all fly fishing there is a slight difference in fly fishing for bass due principally to the added weight of the lures to be used.

In wet fly fishing for bass the angler usually wades the stream with the current but if the current is not too fast sometimes good results are obtained by wading against the current as in dry fly fishing. In any event the fly should be submerged and allowed to flow naturally with the current, always keeping as tight a line as possible according to water conditions and not causing too much drag. Sometimes it is well to occasionally and slightly twitch or jerk the fly.

In using the fly and spinner the lure should be kept in motion a greater part of the time with the line always tight. The current always keeps the spinner in motion and sometimes it is well to hesitate before retrieving the spinner. The added flash of the spinner seems to supply just what the fish desires and the results are well worth while. This lure may be used by retrieving it against the current or across the current. If across much more water can be covered and it eventually straightens out with the current to be retrieved against the current. In the late fall fishing during October and even into November the fly and spinner are very effective if used along the shores where the water breaks into deeper water. If this is unsuccessful it may be used very effectively from a boat by trolling. Place a small sinker about six feet above the lure so that it will sink to the desired depth and let out from forty to fifty feet of line. When the bass hits there is immediately the buzz of the reel which adds greatly to the thrill. It is not uncommon to take many large bass in this manner.

The beginner must have confidence in himself and assurance that fly fishing is no mystery but truly easier than bait fishing, and he can almost immediately catch fish. The finer points of the art will develop rapidly with practice. The beginner must not be deceived and think that great strength is what is needed to become a successful fly fisherman. The rod is the supplied strength that hurls the line forward. It is not the fly that is cast but the line, with the rod supplying the carrying power and the line simply carrying the leader and fly behind. When the line reaches its limit of flight, the leader and fly automatically leap forward and drop to the water surface ahead of the line. Great distance is not necessary to catch fish and from thirty to forty feet is sufficient. Distance if needed will develop with experience.

With the rod fully mounted there should be about twelve feet of line including the leader stripped from the reel and hanging loose from the tip of the rod. The rod should then be snapped back, and a back and forth motion with the rod continued until sufficient line is played out from the first cast. The left hand continually strips line from the reel while this back and forth motion is taking place until the desired length is out. Never allow the rod to go back over the shoulder but keep it in a direct line with the body or even with the hat brim or in a vertical position. When enough line has been stripped from the reel and played out the first cast may be made, and the line, held in the left hand, should be freed on the forward cast at the proper time to allow the line to slip through the guides. The rod at the finish of the forward cast should be in a horizontal position directly in front and slightly raised at once to be ready for the strike or, if using the spinner, the rod should be slowly raised to help keep the spinner in nearer the surface for the pickup just before the back cast. Do not raise the rod too far back so that it will interfere with the pickup and back cast which are made with one and the same motion. The left hand can and should assist greatly in bringing the lure nearer the surface for the pickup and the back cast and will allow the rod to be kept in the proper position. The line, which is retrieved with the left hand, should be held in a coil and at the proper time released on the forward cast. After the cast the line should be immediately picked up with the left hand and securely held in case of a strike. This keeps a tight line when the hook is driven home with the rod, because the fisherman can not use the right hand to thumb the reel as in bait fishing.

The pickup should be a snatch backward and brisk enough to start and carry the fly on its backward flight or back cast. The pivot for both the forward and back casts should be at the elbow and the forearm only should used. Some prefer mere wrist action, either will work, but in any event never use the whole arm. Keep the upper arm close to the body and forget that it is there. Stop the rod on the back cast in a direct line with the body and allow time enough for the back cast to be completed. This will automatically be realized by the feel of a slight tug, when the forward cast should and must be started immediately with a brisk, choppy, downward stroke with the forearm. The line, leader and fly automatically follow through. A little practice on the back cast will perfect proper timing so that it will soon be a matter of reflex action. Never allow too much time on the back cast or be too quick on the forward cast as both faults will result in a poor cast or no cast at all. Never try to cast directly at the objective on the water but from two to three feet above. This not only allows the leader and fly to follow through properly but allows the fly to light on the water more naturally.

Last Meal

Dave Dahlgren, special warden, at Philipsburg, recently saw a strange object floating on the surface of the Little Black Moshannon while patrolling the stream. Closer investigation revealed it to be a watersnake, its fangs securely fastened in a large bullfrog. After killing the reptile, Dahlgren examined the contents of its stomach and found that it had apparently just finished a final meal on an eight-inch brown trout.

GOOD CATCHES OF BASS ON ALLEGHENY

Fishermen in the northern part of the state are acclaiming the best bass fishing in the Allegheny River that has been enjoyed in years. Long famous for its trout streams, the country drained by the Allegheny in recent years did not rank so well in the bass category. Careful stocking of the stream, however, coupled with anti-pollution methods and patrolling by wardens of the Fish Commission is bringing it back.

"There have been some real catches of black bass, rock bass, perch, and catfish in the vicinity of Turtle Point and Corydon on the Allegheny this year," writes Fish Warden J. Albert Johnson, of Bradford. "It is a great thing for our fishermen as they can still have fishing when the trout season is ended."

A TYPICAL SPECIMEN OF THE TROUT RELEASED FROM HUNTSDALE HATCHERY IN OCTOBER

October Distribution Tops 2,000,000 Mark

Editor's Note: *In announcing fish distribution for October, the ANGLER, calls attention to the fact that all approved warm water and trout streams in the various counties are on the 1933 stocking list. If your favorite stream is not listed in the October distribution report, and is approved, it has either been stocked already or will be stocked later this year.*

DISTRIBUTION of fish and frogs to waters of Pennsylvania touched another peak in the autumn stocking program during October. The inland waters are stocked with 2,186,380 fish and frogs of sufficient size to insure successful planting for the 1934 fishing season.

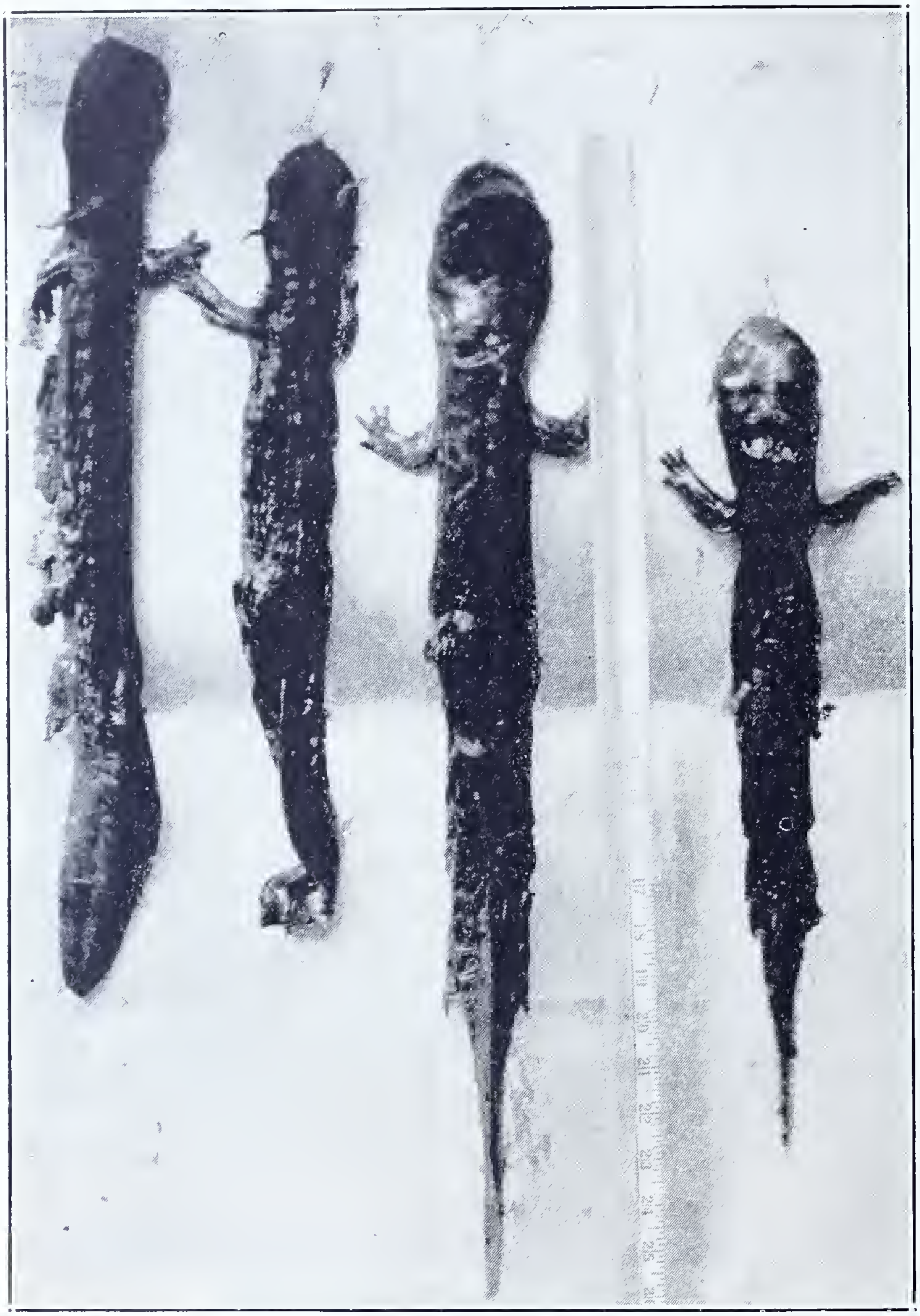
Included in the distribution were 18,990 brook trout from 9 to 12 inches in length; 42,800 brown trout, all but 1600 of them from 9 to 12 inches; 7,492 black bass, 4, 5 and 6 inches in length; 5,008 adult pickerel, 12 inches in length on an average; 145,375 minnows, 2 and 3 inches on an average, stocked as forage for game fish; 37,000 three-inch yellow perch; 1,144,050 fingerling sunfish; 363,765 bullhead catfish from 2 to 8 inches in length, and 421,900 frog tadpoles, 3 and 4 inches in length. Fish and frogs released in October had a value if purchased from commercial hatcheries of $115,144.93.

Reports on stream conditions received at the time of stocking indicate that approved waters were at good levels insuring favorable conditions for fish distributed.

Following is a list of counties stocked, and species distributed to various waters:

Adams—catfish, Little Marsh Creek, Marsh Creek, Conewago Creek; sunfish, Little Marsh Creek, Marsh Creek, Conewago Creek.

Allegheny—catfish, Allegheny River, Myers Pond, Scott Pond No. 1, Scott Pond No.



STRANGE CREATURES, YOU'LL AGREE—THEY'RE SALAMANDERS, OTHERWISE KNOWN AS HELL-BENDERS, WATERDOGS AND CREEK ALLIGATORS

2; sunfish, Allegheny River, Myers Pond, Scott Pond No. 1, Scott Pond No. 2; frogs, Allegheny River, Myers Pond, Scott Pond No. 1, Scott Pond No. 2.

Armstrong—catfish, Buffalo and Susquehanna Coal Co. Dam, Craig Run, Allegheny River, Buffalo Creek; sunfish, Buffalo and Susquehanna Coal Co. Dam, Craig Run, Allegheny River, Buffalo Creek; frogs, Buffalo and Susquehanna Coal Co. Dam, Craig Run, Allegheny River.

Bedford—brown trout, Cumberland Valley Run or Shobers Creek; brook trout, Cove Creek, Deeters Run; catfish, Bobs Creek, Dunnings Creek, Wills Creek, Raystown Branch Juniata River; sunfish, Bobs Creek, Dunnings Creek, Wills Creek, Raystown Branch Juniata River; frogs, Bobs Creek, Dunnings Creek; Wills Creek, Raystown Branch Juniata River.

Berks—brook trout, Northkill Creek; catfish, Boyertown Water Co. Dam, Manatawney Creek, Cacoosing Creek, Tulpehocken Creek; sunfish, Boyertown Water Co. Dam, Manatawney Creek, Cacoosing Creek, Tulpehocken Creek; frogs, Tulpehocken Creek.

Blair—brook trout, Bald Eagle Creek, Van Scoyoc Creek, Big Fill Run, Blairs Gap Run, Poplar Run, Clover Creek, Sandy Run.

Bradford—yellow perch, North Branch Susquehanna River; catfish, North Branch Susquehanna River, Sunfish Pond, Lake Wesauking, Nephawin Lake, Barnes Pond, Stowell Pond, Spring Pond, Cooks Pond, Beaver Meadow Pond, Blakeslee Pond; sunfish, North Branch Susquehanna River, Sunfish Pond, Lake Wesauking, Nephawin Lake, Barnes Pond, Stowell Pond, Spring Pond, Cooks Pond, Beaver Meadow Pond, Blakeslee Pond; minnows, North Branch Susquehanna River, Sunfish Pond, Lake Wesauking, Nephawin Lake.

Bucks—catfish, Delaware River, Neshaminy Creek; black bass, Neshaminy Creek; Tinicum Creek; sunfish, Delaware River, Neshaminy Creek; frogs, Neshaminy Creek.

Butler—brook trout, North Branch Slippery Rock Creek, McMurrays Run; catfish, Trees Boy Camp Pond; sunfish, Trees Boy Camp Pond; frogs, Little Connoquenessing Creek, Breakneck Creek.

Cambria—brook trout, Mudlick Run, South Fork of Little Conemaugh River; brown trout, Chest Creek; catfish, Walters Dam on Beaver Dam Creek, Mudlick Run, Slatelick or Crooked Creek, Chest Creek, New Borough Dam, Howe Run, North Branch Little Conemaugh River, Clearfield Creek, Pennsylvania Coal and Coke Company Dam, Rowena Lake yellow perch, Rowena Lake; sunfish, Walters Dam, Mudlick Run, Slatelick Creek, Chest Creek, New Borough Dam, Howe Run, North Branch Little Conemaugh River, Clearfield Creek, Pennsylvania Coal and Coke Company Dam, St. Francis Lake; frogs, Walters Dam, Mudlick Run, Slatelick Creek, Chest Creek, New Borough Dam, Howe Run, North Branch Little Conemaugh River, Clearfield Creek, Pennsylvania Coal and Coke Company Dam, Rowena Lake.

Cameron—brook trout, Mix Run; brown trout, Driftwood Branch.

Carbon—brown trout, Pohopoco Creek; catfish, Harmony Lake, Mahoning Creek; sunfish, Harmony Lake, Mahoning Creek; frogs, Harmony Lake, Mahoning Creek.

Centre—brook trout, West Branch of Big Run, Mountain Branch, Pine or Sterling Run, Six Mile Run, Galbraiths Gap Run; brown trout, Spring Creek, Hosler Dam on Half Moon Run, Bald Eagle Creek, Poe Creek, Little Moshannon Creek, Penns Creek; black bass, Little Moshannon Creek; yellow perch, Little Moshannon Creek; catfish, Little Moshannon Creek, Kepharts Dam, Reservoir Dam, Shields Dam; sunfish, Little Moshannon Creek, Kepharts Dam, Reservoir Dam, Shields Dam; frogs, Reservoir Dam, Kepharts Dam, Shields Dam.

Chester—catfish, Brandywine Creek, North Branch Brandywine Creek, Potts Dam on Perkins Run; sunfish, Brandywine Creek, North Branch Brandywine Creek, Potts Dam on Perkins Run.

Clarion—brown trout, Piney Creek; minnows, Red Bank Creek; sunfish, Allegheny River, Red Bank Creek; catfish, Red Bank Creek; frogs, Allegheny River, Red Bank Creek.

Clearfield—brown trout, Laurel Run, Little Clearfield Creek, Lick Run, Sugar Camp Run; sunfish, Kneedlers Dam, Berwinsdale Lake, Beaver Run, Sabula Dam on Sandy Lick Creek, B. R. & P. Coal Company Dam on Stump Creek, Shaft Dam; catfish, Kneedlers Dam, Berwinsdale Lake, Beaver Run, Sabula Dam on Sandy Lick Creek, B. R. & P. Coal Co. Dam on Stump Creek, Shaft Dam, Pine Grove Inn; frogs, Kneedlers Dam, Berwinsdale Lake, Beaver Run, Sabula Dam on Sandy Lick Creek, B. R. & P. Coal Company Dam on Stump Creek, Shaft Dam.

Clinton—brook trout, Long Run, Chatham Run; catfish, Queens Run, Drurys Run, Left Hand, Branch Young Woman's Creek, Livancy Run, Benjamin Run, Bald Eagle Creek, Lick Run, Right Branch Young Woman's Creek, Bald Eagle Canal; sunfish, Bald Eagle Creek, Bald Eagle Canal; frogs, Bald Eagle Creek, Bald Eagle Canal.

Columbia—brook trout, Mugser Run;

brown trout, Fishing Creek; yellow perch, Huntingdon Creek; catfish, Fishing Creek, Huntingdon Creek, Little Fishing Creek, Green Creek, North Branch Susquehanna River, Roaring Creek; minnows, Fishing Creek, Little Fishing Creek, Green Creek; sunfish, Fishing Creek, Little Fishing Creek, Green Creek, North Branch Susquehanna River, Roaring Creek; frogs, Little Fishing Creek.

Crawford—brown trout, Little Sugar Creek; sunfish, Conneaut Creek, Conneaut Lake, Drakes Mill Dam on Conneautee Creek, French Creek, Clear Lake, Canadohta Lake, Sugar Lake, Oil Creek; catfish, Conneaut Lake, Conneaut Creek, Drakes Mill Dam on Conneautee Creek, French Creek, Clear Lake, Canadohta Lake, Oil Creek; frogs, Conneaut Lake, Conneaut Creek, Drakes Mill Dam on Conneautee Creek, French Creek, Oil Creek.

Cumberland—brook trout, Big Springs Run, Oldtown Run; yellow perch, Carlisle Water House Dam on Conodoguinet Creek.

Dauphin—brown trout, West Branch Rattling Creek, East Branch Rattling Creek; catfish, Italian Lake, Wildwood Lake; sunfish, Italian Lake, Wildwood Lake; frogs, Italian Lake, Wildwood Lake.

Delaware—brown trout, Ridley Creek; catfish, Ridley Park Lake, Chester Creek, Darby Creek, Ridley Creek, Kaolin Quarry; sunfish, Ridley Park Lake, Chester Creek, Darby Creek, Ridley Creek, Kaolin Quarry: frogs, Chester Creek, Ridley Creek, Kaolin Quarry.

Elk—brown trout, West Branch of Clarion Creek, Big Mill Creek; sunfish, Ridgway Water Works Reservoir; catfish, Ridgway Water Works Reservoir; frogs, Ridgway Water Works Reservoir.

Erie—black bass, Presque Isle Bay; yellow perch, Presque Isle Bay; sunfish, Lake Erie Bay, French Creek, West Branch French Creek, South Branch French Creek, Lake Pleasant, Lake LeBoeuf, Edinboro Lake; catfish, Lake Erie Bay, French Creek, West Branch French Creek, South Branch French Creek, Lake Pleasant, Lake LeBoeuf, Edinboro Lake, Preque Isle Bay; frogs, Lake Erie Bay, French Creek, West Branch French Creek, South Branch French Creek, Lake Pleasant, Lake LeBoeuf, Edinboro Lake.

Fayette—brook trout, Buck Run; sunfish, Dunbar Corp. Dam No. 1, Dunbar Corp. Dam No. 2, Brownfield or Redstone Dam, Cool Springs or Lemont Dam, Layton Reservoir, Indian Creek, Crabapple Reservoir, Smock Reservoir, Lower Star Junction Dam, Upper Star Junction Dam.

Forest—brown trout, West Hickory Creek, West Branch Caldwell Creek; catfish, Allegheny River; sunfish, Allegheny River.

Franklin—catfish, Conodoguinet Creek, West Branch Conococheague Creek, Backs Creek, Muddy Run; sunfish, Conodoguinet Creek, East Branch Conococheague Creek, Backs Creek, Muddy Run; frogs, Conodoguinet Creek, East Branch Conococheague Creek, Backs Creek, Muddy Run.

Greene—catfish, South Fork Dunkard Dunkard Fork of Wheeling Creek, Wheeling Creek, North Fork Dunkard Fork of Wheeling Creek, Enslow Fork; sunfish, South Fork Dunkard Fork of Wheeling Creek, Wheeling Creek, North Fork Dunkard Fork Wheeling Creek, Enslow Fork; frogs, South Fork Dunkard Fork of Wheeling Creek, Wheeling Creek, North Fork Dunkard Fork Wheeling Creek, Enslow Fork.

Huntingdon—brook trout, Shavers Creek, W. Licking Creek, Laurel Run, Black Log Creek; catfish, Shavers Creek, Frankstown Branch Juniata River, Whipple Dam on Laurel Run, Standing Stone Creek, Laurel Run, Licking Creek; sunfish, Shavers Creek, Frankstown Branch Juniata River, Whipple Dam on Laurel Run, Standing Stone Creek, Juniata River; frogs, Shavers Creek, Frankstown Branch Juniata River, Whipple Dam on Laurel Run, Standing Stone Creek, Juniata River.

Indiana—catfish, Cush Cushion Creek, Muddy Run; sunfish, Cush Cushion Creek, Muddy Run; frogs, Cush Cushion Creek, Muddy Run.

Jefferson—brown trout, North Fork Red Bank Creek; brook trout, Laurel Run, Coder Run; black bass, Red Bank Creek; yellow perch, Red Bank Creek; minnows, Red Bank Creek; catfish, Falls Creek, Boro Storage Dam on Falls Creek, Strouse Dam, Little Sandy Creek, Water Spring Dam on North Fork Creek, Elnora Dam on Big Run, Bath Pond, Red Bank Creek; sunfish, Falls Creek, Boro Storage Dam on Falls Creek, Water Spring Dam on North Fork Creek, Strouse Dam, Little Sandy Creek, Elnora Dam on Big Run, Bath Pond, Red Bank Creek; frogs, Falls Creek, Boro Storage Dam on Falls Creek, Water Spring Dam on North Fork Creek, Strouse Dam, Little Sandy Creek, Elnora Dam on Big Run, Bath Pond, Red Bank Creek.

Lackawanna—minnows, Johnson Lake, Moosic Lake, North Branch Susquehanna River; frogs, Windfall or Kewauna Lake; catfish, Johnson Lake, Moosic Lake, North Branch Susquehanna River, Kewauna Lake, Mud Pond, Deer Lake, Whipoorwill Pond, West End Lake, Lower Klondyke Lake; sunfish, Johnson Lake, Moosic Lake, North Branch Susquehanna River, Kewauna Lake, Mud Pond, Deer Lake, Whipoorwill Pond, West End Lake, Lower Klondyke Lake.

Lancaster—brook trout, Donegal Creek, Big Chiekies Creek, Charles Run, Indian Run, Fishing Creek, Muddy Creek; black bass, Safe Harbor Dam; yellow perch, Safe Harbor Dam; frogs, Safe Harbor Dam; catfish, Little Conestoga Creek, Conestoga Creek, Conowingo Creek, West Branch Octoraro Creek, Safe Harbor Dam, Pequea Creek; sunfish, Little Conestoga Creek, Safe Harbor Dam, Conestoga Creek, Conowingo Creek, West Branch Octoraro Creek, Pequea Creek.

Lawrence—catfish, North Fork of Little Beaver Run, Offutt Dam on Taylor Run, Carbon Quarry Pool; sunfish, North Fork of Little Beaver Run, Offutt Dam on Taylor Run, Cement Dam, Carbon Quarry Pool; frogs, North Fork of Little Beaver Run, Offutt Dam on Taylor Run, Carbon Quarry Pool.

Lebanon—brook trout, Big Chickies Creek; catfish, Stavers Dam, Lights or Kiwanis Dam, Little Swatara Creek, Water Works Dam, Conewago Creek, Stracks Dam; sunfish, Stavers Dam, Lights or Kiwanis Dam, Little Swatara Creek, Water Works Dam, Conewago Creek, Stracks Dam.

Lehigh—brown trout, Little Lehigh River; catfish, Ontelaunce Creek, Henninger Mine Hole, Jordan Creek; sunfish, Ontelaunce Creek, Henninger Mine Hole, Jordan Creek; frogs, Ontelaunce Creek, Henninger Mine Hole, Jordan Creek.

Luzerne—brown trout, Lehigh River, Hunlock Creek; yellow perch, Silkworth or Three Cornered Lake, Cranberry Pond, Sugar Notch Dam, North Branch Susquehanna River; pickerel, Sugar Notch Dam, North Pond; minnows, Silkworth or Three Cornered Lake, Sugar Notch Dam, Ice Lake, North Pond, Penn Lake; catfish, Silver Lake, Harveyville Dam, Cummings Pond, Mountain Spring Ice Co. Dam No. 1, Mountain Spring Ice Co. Dam No. 2, Browns Pond, Ice Lake, Rouch Lake, Paper Mill Dam on Huntingdon Creek, North Pond, Penn Lake, White Haven Dam, Barneys Pond, Harveys Lake, Cranberry Pond, North Branch Susquehanna River, Sugar Notch Dam, Silkworth or Three Cornered Lake; sunfish, Sugar Notch Dam, Silkworth or Three Cornered Lake, Cranberry Pond, North Branch Susquehanna River, Silver Lake, Harveyville Dam, Cummings Pond, Mountain Spring Ice Co. Dam No. 1, Mountain Spring Ice Co. Dam No. 2, Browns Pond or Perrins Marsh, Ice Lake, Ider Pond or Barneys Pond, Rouch Lake, Paper Mill Dam on Huntingdon Creek, Steins Pond, North Pond, Penn Lake, White Haven Dam; frogs, Silkworth or Three Cornered Lake, Cranberry Pond, North Branch Susquehanna River, Silver Lake, Harveyville Dam, Cummings Pond, Mountain Spring Ice Co. Dam No. 1, Mountain Spring Ice Co. Dam No. 2, Browns Pond or Perrins Marsh, Ice Lake, Ider Pond or Barneys Pond, Rouch Lake, Paper Mill Dam on Huntingdon Creek.

Lycoming—brown trout, Slate Run, Lycoming Creek.

McKean—brown trout, West Branch Tuneneguent Creek; sunfish, Hamlin Lake, Kushequa Pond, Allegheny River; catfish, Allegheny River; frogs, Allegheny River.

Mercer—sunfish, Otter Creek, Cool Spring Creek, Tingley Dam No. 1, Finley Pond, Shenango River, Furnace Pond, Pymatuning Creek, Sandy Lake; catfish, Otter Creek, Cool Spring Creek, Tingley Dam No. 1, Finley Pond, Shenango River, Furnace Pond, Pymatuning Creek, Sandy Lake, Tingley Dam No. 2, Sandy Creek; frogs, Otter Creek, Cool Spring Creek, Tingley Dam No. 1, Finley Pond, Shenango River, Furnace Pond, Pymatuning Creek, Tingley Dam No., 2, Sandy Creek.

Mifflin—brook trout, McKinley Run, Brookland Run.

Monroe—minnows, Delaware River, Pocono Summit Lake, Long Pond; catfish, Delaware River, Pocono Summit Lake, Long Pond, Trout Lake, Little Saylor Lake, Rake Dam, Lake Mineola, Half Moon Pond, Mountain Ice Co. Dam No. 1, Echo Lake, Hawkeys Pond; sunfish, Delaware River, Pocono Summit Lake, Long Pond, Trout Lake, Little Saylor Lake, Rake Dam, Lake Mineola, Half Moon Pond, Mountain Ice Co. Dam No. 1, Echo Lake, Hawkeys Pond.

Montour—minnows, Mahoning Creek, North Branch Susquehanna River, Chillisquaque Creek; catfish, Mahoning Creek, North Branch Susquehanna River, Chillisquaque Creek; sunfish, Mahoning Creek, North Branch Susquehanna River, Chillisquaque Creek.

Northampton—brook trout, Saucon Creek, Hokendauqua Creek; brown trout, Bushkill Creek, Martins Creek.

Northumberland — minnows, Mahantongo Creek, Warriors Run, Chillisquaque Creek; catfish, Mahantongo Creek, Warriors Run, Chillisquaque Creek; sunfish, Mahantongo Creek, Warriors Run, Chillisquaque Creek.

Perry—brook trout, Laurel Run; catfish, Susquehanna River; frogs, Susquehanna River; sunfish, Susquehanna River.

Pike—yellow perch, Pecks Pond, Promised Land Pond, Lake Wallenpaupack; pickerel, Pecks Pond, Promised Land Pond, Lake Wallenpaupack, Minisink Lake; minnows, Promised Land Pond, Lake Wallenpaupack, Delaware River, Westcolang Lake, Teddyuscong Lake, Greely Lake, White Deer Lake, Fairview Lake, Minisink Lake, Mud Pond; catfish, Promised Land Pond, Lake Wallenpaupack, Delaware River, Westcolang Lake, Teddyuscong Lake, Greely Lake, White Deer Lake, Fairview Lake, Minisink Lake, Mud Pond, Lower Shohola Falls Dam, Sawkill Pond, Big Walker Lake, Forest Lake, Lake Taminent; sunfish, Lake Wallenpaupack, Delaware River, Westcolang Lake, Teddyuscong Lake, Greely Lake, White Deer Lake, Fairview Lake, Minisink Lake, Mud Pond, Lower Shohola Falls Dam, Sawkill Pond, Big Walker Lake, Forest Lake, Lake Taminent; frogs, Pecks Pond, Promised Land Pond, Lake Wallenpaupack.

Potter—brown trout, Oswayo Creek, Allegheny River, Kettle Creek, Pine Creek, Mill Creek; sunfish, Rose Lake; catfish, Rose Lake; frogs, Rose Lake.

Schuylkill—catfish, Pine Creek, Old Union Canal, Combola or Tommies Dam, Sweet Arrow Lake, Hosensock Creek, Mud Run Pond, Upper Dam on Tumbling Run, Lower Dam on Tumbling Run, Suckers Pond, New Philadelphia Dam, Landingville Tunnel Pond, Deer Lake Dam on Pine Creek, Dock Pond, Mahantongo Creek, Deep Creek or Deaf Creek, Lizard Creek, Mahoning Creek, Kauffman Dam; sunfish, Pine Creek, Old Union Canal, Cumbola or Tommies Dam, Sweet Arrow Lake, Hosensock Creek, Mud Run Pond, Upper Dam on Tumbling Run, Lower Dam on Tumbling Run, Suckers Pond, New Philadelphia Dam, Landingville Tunnel Pond, Deer Lake Dam on Pine Creek, Dock Pond, Mahantongo Creek, Deep Creek or Deaf Creek, Lizard Creek, Mahoning Creek, Kauffman Dam; frogs, Sweet Arrow Lake, Hosensock Creek, Mud Run Pond, Landingville Tunnel Pond, Deer Lake Dam on Pine Creek, Dock Pond, Mahantongo Creek, Deep Creek or Deaf Creek, Lizard Creek, Mahoning Creek, Kauffman Dam.

Snyder—yellow perch, Mahantongo Creek; minnows, North Branch Mahantongo Creek, Penns Creek; sunfish, Mahantongo Creek, Penns Creek, Fogles Mill Dam on North Branch Mahantongo Creek; catfish, Mahantongo Creek, North Branch Mahantongo Creek, Penns Creek; frogs, Mahantongo Creek.

Somerset—catfish, McDonaldson Dam on Buffalo Creek, Middle Creek, Youghiogheny River; sunfish, McDonaldson Dam on Buffalo Creek, Middle Creek, Youghiogheny River; frogs, McDonaldson Dam of Buffalo Creek, Middle Creek, Youghiogheny River.

Sullivan—brook trout, Sullivan Branch E. Fishing Creek; brown trout, Little Loyalsock Creek, Loyalsock Creek; yellow perch, Painter Den Pond; pickerel, Painter Den Pond; catfish, Hunters Lake, Painter Den Pond, Grant Lake, Splash Dam, Williams Lake or Little Lake, Elk Lake, Mud Lake; minnow, Hunters Lake, Grant Lake, Splash Dam, Williams Lake, Elk Lake; sunfish, Painter Den Pond, Hunters Lake, Grant Lake, Splash Dam, Williams Lake, Elk Lake, Mud Lake.

Susquehanna—yellow perch, North Branch Susquehanna River; minnows, North Branch Susquehanna River; Tuscarora Lake, Heart Lake, Big Elk Lake, Round Pond, Beaver Pond, Lower Lake, Middle Lake, Upper Lake, Forest Lake; catfish, North Branch Susquehanna River, Tuscarora Lake, Heart Lake, Big Elk Lake, Round Pond, Beaver Pond, Lower Lake, Middle Lake, Upper Lake, Forest Lake, Jones Lake, Brewster Lake, Tingley Lake, Tyler Lake, Hells Half Acre, Lakeside or Tarble Pond, Lords Pond, Stearns Lake, Arrowhead Lake, Butler Lake Alford Pond, States Pond, Carr Lake, Schoolys Pond, Idlewild Lake, Fox Pond, South Pond, Bigsbys Pond, Quaker Lake, Laurel Lake, Cotterel Lake, Lewis Lake, Lowe Lake; sunfish, North Branch Susquehanna River, Tuscarora Lake, Heart Lake, Big Elk Lake, Round Pond, Beaver Pond, Lower Lake, Middle Lake, Upper Lake, Forest Lake, Jones Lake, Brewster Lake, Tingley Lake, Tyler Lake, Hells Half Acre, Lakeside or Tarble Pond, Lords Pond, States Pond, Carr Lake, Schoolys Pond, Idlewild Lake, Fox Pond, South Pond, Bigsbys Pond, Quaker Lake, Laurel Lake, Cotterel Lake, Lowe Lake, Stearns Lake, Arrowhead Lake, Butler Lake, Alford Pond.

Tioga—brown trout, Pine Creek; sunfish, Longwell Pond, Blacks Pond, Crooked Creek, Marsh Creek; catfish, Longwell Pond, Blacks Pond, Crooked Creek, Marsh Creek; frogs, Longwell Pond, Blacks Pond, Crooked Creek, Marsh Creek.

Union—brown trout, Laurel Run, Penns Creek, Weikert Creek, White Deer Creek; minnows, Buffalo Creek, Penns Creek, Little Buffalo Creek, Laurel Park Dam on Penns Creek, Millmont Dam, New Berlin Dam, Turtle Creek, White Deer Hole Creek; frogs, Herbsters Mill Dam; catfish, Penns Creek, Buffalo Creek, Little Buffalo Creek, Laurel Park Dam on Penns Creek, Millmont Dam, New Berlin Dam, Turtle Creek, White Deer Hole Creek; sunfish, Penns Creek, Buffalo Creek, Little Buffalo Creek, Laurel Park Dam, Millmont Dam, New Berlin Dam, Turtle Creek, White Deer Hole Creek.

Venango—brook trout, Little Scrubgrass Creek; sunfish, Cooperstown Dam on Lake Creek, Allegheny River; catfish, Cooperstown Dam on Lake Creek, Allegheny River, frogs, Cooperstown Dam on Lake Creek, Allegheny River.

Warren—brown trout, Tionesta Creek; black bass, Conowango Creek; sunfish, Bear Lake, Columbus Pond, Allegheny River, Conowango Creek; catfish, Bear Lake, Columbus Pond, Allegheny River, Conowango Creek; frogs, Bear Lake, Columbus Pond, Allegheny River, Conowango Creek.

Wayne—minnows, Delaware River; catfish, Delaware River, Cadjaw Pond, Bunnells Pond, Snag Pond, Huffs Pond, Klines Pond, Justins Pond, Bigelow Lake, Kiser Dam, Searles Dam, Seeleyville Pond, Crockenburg Pond, Keens Pond, North Branch Susquehanna River; sunfish, Delaware River, Cadjaw Pond, Bunnells Pond, Snag Pond, Huffs Pond, Klines Pond Justins Pond, Bigelow Lake, Kiser Dam, Seeleyville Pond, Crockenburg Pond, Keens Pond; frogs, Delaware River, Cadjaw Pond, Bunnells Pond, Snag Pond.

Westmoreland—brook trout, Loyalhanna Creek; catfish, Margarite Reservoir, Bagley Reservoir, Beatty Lake, Greenwalt Dam, Mammoth Dam, Carpentertown Dam; sunfish, Margarite Reservoir, Bagley Reservoir, Beatty Lake, Greenwalt Dam, Mammoth Dam, Carpentertown Dam; frogs, Margarite Reservoir, Bagley Reservoir, Beatty Lake, Greenwalt Dam, Mammoth Dam, Carpentertown Dam.

Wyoming—yellow perch, Lake Carey, North Branch Susquehanna River; minnows, Lake Carey, North Branch Susquehanna River, Lake Winola; catfish, Mud Pond, Lake Winola, North Branch Susquehanna River, Lake Carey; sunfish, Lake Carey, North Branch Susquehanna River, Lake Winola, Mud Pond.

York—catfish, Little Conewago Creek, Kohlers Mill Dam, South Branch Codorus Creek, Dunkards Valley Ore Hole, Feiglers Ore Hole, Conewago Creek, Bermudian Creek, North Branch Bermudian Creek, Silver Lake; sunfish, Little Conewago Creek, Kohlers Mill Dam, South Branch Codorus Creek, Dunkards Valley Ore Hole, Feiglers Ore Hole, Conewago Creek, Bermudian Creek, North Branch Bermudian Creek, Silver Lake; frogs, Kohlers Mill Dam, South Branch Codorus Creek, Dunkards Valley Ore Hole, Feiglers Ore Hole.

PASSING OF STURGEON

(Continued from Page 9)

and is known as Albany beef, the head, skin and back bone being rendered into oil, passing through a boiling process. Of this on an average of six barrels per week are produced during the season, netting sixty cents per gallon. Of the roes caviar is made. It is prepared in this way: The roes are taken from the dead fish and run through several sieves of graduated fineness, and then treated with the finest of German salt, an indispensable article in its preparation; it is then packed in open kegs and placed in a cool position until the season of shipment, the fall, when it is transported to Germany, where it commands, on an average, one dollar per pound.' "

Today the sturgeon is a memory, but its slaughter serves to emphasize the urgent need for the present program of fish conservation now in effect in Pennsylvania.

Butler Sportsmen Kill Many Snakes

The watersnake-killing contest conducted by the Butler Hunting and Fishing Club last summer was an outstanding success, according to J. H. Bergman, special warden, of Butler.

High scorer in the contest was Harry Patten, of Chicora, R. D. 4. During the season, Patten killed 443 watersnakes and was awarded a fine repeating rifle as first prize. Walter Grieb, of Butler, however, pressed Patten hard for top honors in the campaign against watersnakes. The Butler sportsman, with 400 watersnakes to his credit, won the second prize, a casting rod.

Hogs are O.K. as pork, but they have no relationship to fishing.

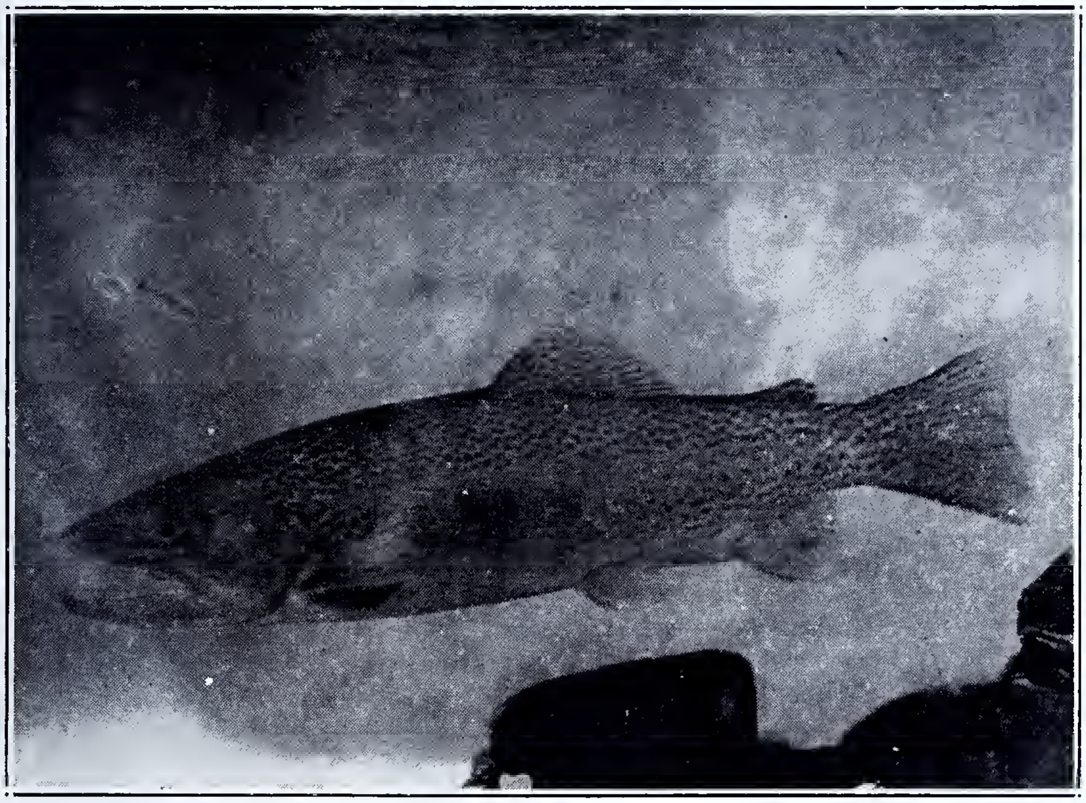
HOW FISH LIVE

For convenience fish are classed under three heads, game fish, food fish, and forage fish.

Fish differ much in energy, courage, and resistance to attack. Those which possess all three attributes in a marked degree and are a fair size when fully grown, are termed game fish. They are prized and much sought after by the angler for the fight or struggle they afford when hooked. The brook trout, the black bass, the yellow perch, and the pike perch, are the most important game fish of Pennsylvania.

When angling for game fish, much wholesome recreative sport is afforded the fisherman; but fish not possessing qualities of gameness in so marked a degree are also sought; because from the time of primitive man, fish have been one of his staple foods.

Fish sought more for their edible qualities than for their gameness, are known as food fish. In the inland waters of this state, it is unlawful to catch food fish other than with rod, hook, and line, but even by this means the number of pounds taken and consumed each year is enormous. Those of our inland food fish most sought after are the catfish, the sucker, the carp, and the eel.



AN OLD-TIMER OF THE TROUT CLAN

Pennsylvania has a shore line on Lake Erie of approximately forty-five miles. Along this shore great industries are maintained by capturing with many kinds of devices, fish to be sold on the market as food.

The fish generally caught by these commercial fishermen are white fish, cisco, and blue pike, and these fish rightfully can be called the chief food fish of Pennsylvania, as they have very few game qualities and are rarely taken by hook and line.

The forage fish are also very important inhabitants of our inland waters. These fish, which rarely exceed six inches in length, usually belong to the minnow family and are commonly called bait fish. There are many varieties and they are adapted to living under all the conditions in which food fish and game fish exist. This is so that they may be used as food for the more desirable species, which eliminates to a certain extent the tendency of the more valuable fish to prey upon one another.

The inland waters of Pennsylvania consist of the cool mountain streams, the home of brook trout, brown trout, and of a number of kinds of minnows; the larger slow moving streams or rivers, the home of black bass, pike perch, yellow perch, suckers, bullheads, and a few other kinds of food fish and game fish, together with various kinds of minnows; and our natural lakes and artificial ponds, the home of pickerel, lake trout, yellow perch, sunfish, bullheads, and minnows.

There can be no distinct line drawn between the fish of the rivers and those of the lakes, as fish that prefer the rivers, like the bass and the pike perch, are found in some of our lakes and our ponds. But where the ponds or the lakes are small and inhabited by such voracious fish as the bass and the pike, the fishing is meagre. Because of their feeding habits, fish of this character require a large range.

Fish, such as yellow perch and bullheads, that prefer the ponds or the lakes, are also found thriving in our rivers. These pond fish, so to speak, living in the rivers, seek the eddies and the quiet waters where conditions are similar to those in the lakes or the ponds.

The chief food of our most important fish, from the angler's point of view, is other fish, and apparently nature intended a number of different kinds of fish to live together in the same body of water, regardless of the toll taken on the smaller ones by the larger individuals. In order that the smaller and less voracious varieties be given a chance, their habits are such that when fully grown the different kinds select different portions of the pond or the body of water they are in for a feeding ground. This different range of feeding ground has a tendency to keep the adult of the larger and more voracious species seeking their food in a different portion of the pond than that used by the adult of the smaller species.

The fish of a small lake or pond can be roughly divided into shore feeders, bottom feeders, nocturnal or night feeders, those feeding in comparatively deep water, and those feeding in extremely deep water.

Of the fish commonly found in our small inland lakes, the sunfish, a shore feeder, takes food both from the top and the bottom of the pond. The pickerel, a true shore feeder, eats other fish chiefly, and its feeding ground is along the shore line among the aquatic plants, which is the feeding place for many of the smaller fish of the lake. The sucker is a good representative of the bottom feeding variety. In an earlier chapter, we spoke of the forms of fish in relation to their feeding habits. By examining the mouth of the sucker with regard to its form and position, one can readily see that nature intended that he should seek his food on the bottom.

The bullhead is a representative of the nocturnal or night feeders, and a feeder in the roily waters where little light penetrates. The lake trout is a feeder of the very deep, cold portions of the body of water he inhabits, and he subsists chiefly upon smaller, more unfortunate fish that by chance enter his range. The yellow perch is a feeder midway between the very deep water feeders, like the lake trout, and the shore feeders, like the pickerel.

Change your lure from time to time if the fish aren't striking. Have a reasonable assortment of artificial bait in the kit. The hooks should be examined from time to time and filed if dull.

The "Angler" for Christmas

Recently an ardent Tioga County fisherman sent in a check for subscriptions to PENNSYLVANIA ANGLER for a number of his friends, suggesting that he wanted them to receive the ANGLER for one year as a Christmas present. Starting with this issue, these fishermen will be in constant touch with fishing in the Keystone State during 1934.

SUBSCRIPTION BLANK

Enclosed find fifty cents ($.50 for one year's subscription to PENNSYLVANIA ANGLER.

Name ....

(Print Name)

Street and Number ....

City ....

HERE AND THERE IN ANGLERDOM

A Record-Breaker

The Upper Delaware River, justly famous as an outstanding stream for trolling for wall-eyed pike, this year had the distinction of yielding the two heaviest wall-eyes taken from Pennsylvania waters in the 1934 fishing season.

When Joe Andrews caught a pike weighing 10½ pounds from the Delaware in July, his catch went unchallenged until late this fall. Andrews' great pike is now runner-up to a mammoth wall-eye taken in November by William Tirty, of Bloomfield, N. J.

The pike caught by the New Jersey fisherman has apparently set a record that will stand for some time. It shaded twelve pounds in weight. To be exact, the big fish tipped the scales at 11 pounds, 8¼ ounces. A fitting climax, the taking of this record-breaker, to one of the greatest trolling seasons in recent years. Warden Frank Brink, of Milford, reported the catch.

Conewango Creek in Warren County is a favorite fishing stream for Mrs. John Young, ardent feminine angler, of Warren, according to Warden R. C. Bailey, of Youngsville. Mrs. Young caught 80 bass from this stream during the season, the largest, a smallmouth, weighing 3½ pounds.

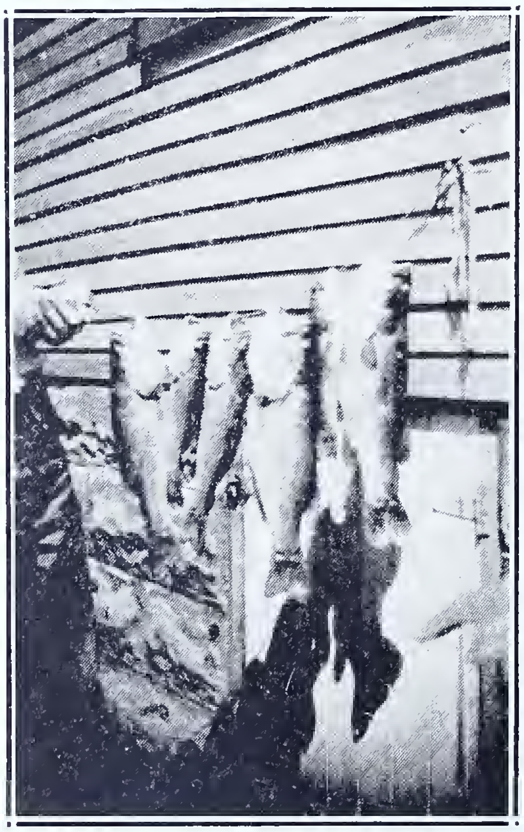
Bailey reports that during the season he shot 38 watersnakes and two kingfishers while patroling the streams. Two of the snakes were in the act of swallowing trout when killed.

"Dad" Right of Mifflin has set a fine record for pickerel fishing in Juniata county. During October he caught 39 pickerel, most of them 18 and 19 inches in length, from Zook's Dam on Licking Creek, according to Warden Charley Long of East Waterford.

Sucker fishing on the Juniata river is now occupying the angling limelight in central Pennsylvania. Great catches of these popular fish are made from this stream during winter and early spring months.

A smallmouth bass, 20 inches in length and weighing 4½ pounds was taken from the North Branch of the Susquehanna river recently by John Rishel, Catawissa, writes Warden Charles Litwhiler. Rishel made his catch near Catawissa.

The Perkiomen Creek and its tributaries are famous as smallmouth bass streams. Roy Patterson, of East Greenville, however, upset the rule when he recently landed a 20-inch largemouth bass from Deep Creek, according to Warden J. Clayton Reed of Ambler.



ONEIDA DAM LARGEMOUTH BASS LENGTH 14 TO 20 INCHES CAUGHT BY FRED CROFT, BUTLER

Tioga county sportsmen, according to Warden Horace Boyden of Wellsboro, are already counting the days until the opening of trout season. One reason for the intense interest is an abundance of trout observed on the spawning beds of Tioga county's great trout streams this autumn. Not only are the fish plentiful but some exceptionally big fellows have been seen. Keen interest is taken in the spawning of the fish, and one angler derives satisfaction in knowing that a giant brook trout he lost while fishing Phoenix Run on July 4 is "still there."

Boy sportsmen of Morgantown, Chester county, are actively engaged in stream improvement work on waters in that vicinity.

Catches Pickerel on Artificial Grasshopper

From Warden E. W. Davis, of Scranton, comes word of an unusual catch on an artificial grasshopper.

While fishing in Fords Lake, C. M. Shriner, of Scranton, hooked and landed a 22½-inch pickerel on the "fake" 'hopper. Pickerel are voracious feeders on other fish, particularly minnows, and when they strike at a grasshopper, artificial or otherwise, it's real "fish news."

A live frog used as bait recently brought to the creel of Charles Beebe, Scranton, a smallmouth bass weighing 4½ pounds and measuring 19⅜ inches in length. Beebe made his catch in Lake Wallenpaupack at Ledgedale. A 25¼ inch pickerel was taken from Wallenpaupack by George Wilson of Scranton. Wilson's catch weighed five pounds.

Autumn fishing in Wyalusing Creek has been exceptionally good this year, according to Myron Shoemaker, warden at Laceyville. Roy Stetler and Rollo Smethers, Harrisburg anglers, recently caught twenty nice smallmouth bass in a day's fishing. In seven trips to the Wyalusing, Stetler told Shoemaker he had taken ten bass on each occasion.

Just before he talked with Smethers and Stetler, Shoemaker had met another fisherman on the stream who was complaining about the few bass present in the Wyalusing.

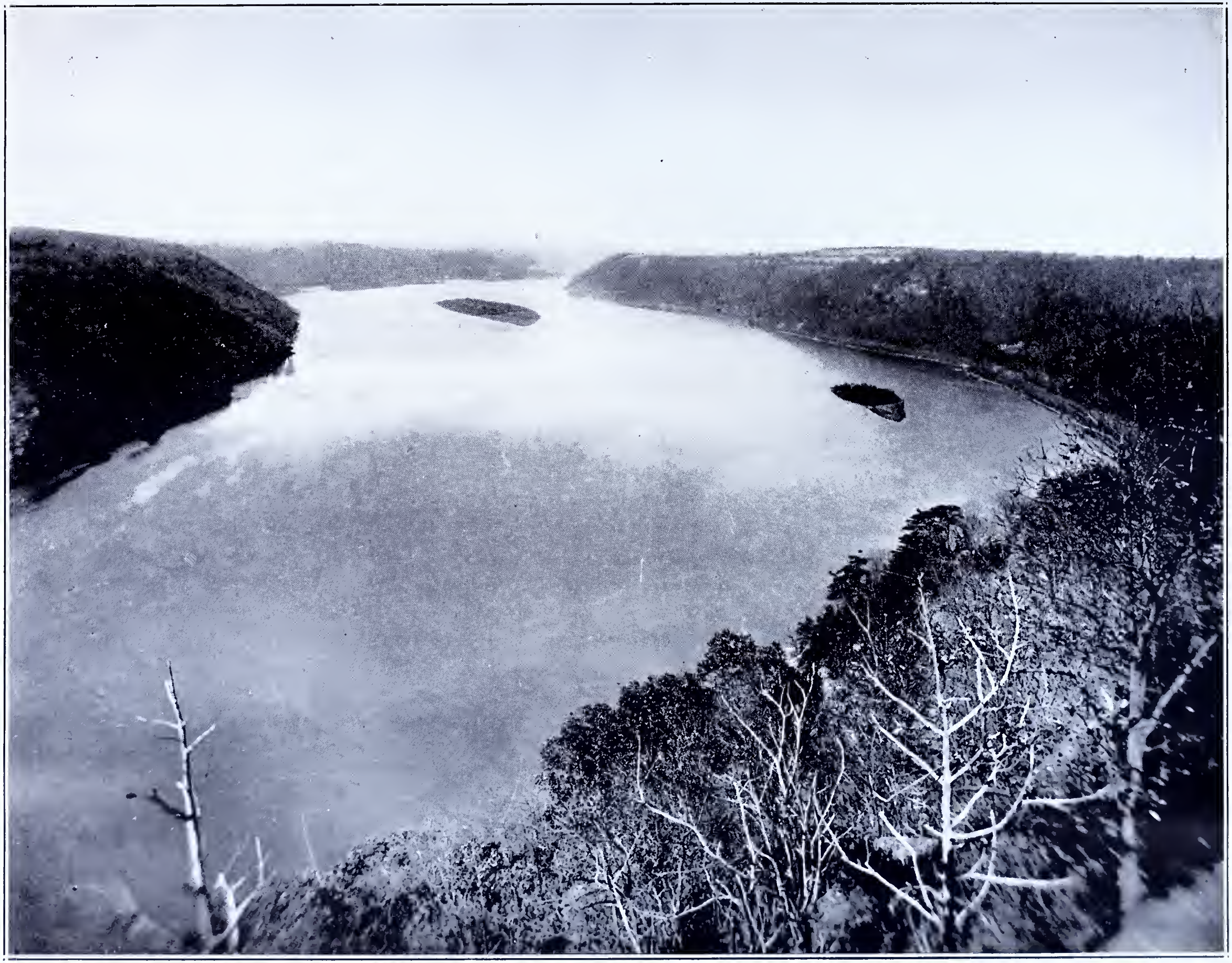
Del Broadbelt, warden at Pocopson, tells a good one on Wilson McMullen, of Marietta. It seems that Wilson was trout fishing for what he believed to be a record trout under a bridge on a tributary stream to Gladfelter Run in Lancaster county. Having lost two leaders to the supposedly big trout, McMullen glanced under the bridge and saw two little boys who had been cutting his line each time it drifted by them.

Raymond Stein of Coatesville was a proud boy recently when he landed a 3¾ pound bass from a tributary of Bucks Run, according to Warden Lewis H. Proudfoot of Elverson, Chester county.

Reports received at the Fish Commission indicate that brown trout are extremely plentiful this year on Cedar and Slate Runs and Upper Pine Creek on the North Tier. More trout are on the spawning beds this year in these streams than have been seen since the autumn of 1929.

The taking of a garpike, 18 inches in length, on Marsh Creek, Tioga county, by Mr. Mitchell of Wellsboro recently created a sensation in that vicinity, according to Warden Boyden. The gar was termed by persons who saw it the most vicious looking fish ever seen in Wellsboro.

A typical party catch on Lake Wallenpaupack was made recently by Milton Harris, Paul Degshur, and Harry Irvin, Jr., of Reading. Fishing only in the morning, they caught five largemouth bass, two smallmouth bass, one weighing three and one quarter pounds, and a wall-eyed pike tipping the scales at four and one quarter pounds, according to Warden Frank Brink.



VIEW OF LAKE CLARK, ABOVE SAFE HARBOR DAM ON THE LOWER SUSQUEHANNA

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
Harrisburg, Pa.
Permit No. 270

The PENNSYLVANIA ANGLER

EXTENDS

Christmas Greetings

TO ITS READERS

MAY 1934 BRING MANY HAPPY DAYS ASTREAM